Haz-Mat Response Disposal, Inc. sm

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RETURN RECEIPT REQUESTED

December 11, 1997

Ms. Cindy Kemper, Program Director
Missouri Department of Natural Resources
Hazardous Waste Program PO Box 176
Jefferson City, MO 65102-0176

Re: RCRA Facility Investigation Report
Permit No.: MOD981123391
Facility: Haz-Mat Response Disposal, Inc.
6300 Stadium Drive, Kansas City, MO 64129

Dear Ms. Kemper:

The attached document is submitted as the final report of the RCRA Facility Investigation conducted in accordance with the Facility's permit (Corrective Action section I.A. page 69 of 84).

If there are any questions or I can be of any further assistance please contact me at (816) 924-5884.

Respectfully Submitted,

Jim Creighton
Safety and Compliance

A8

6300 Stadium Drive - Kansas City, MO 64129
(816) 924-5884 • FAX (816) 924-1453 • Watts 888-429-0278

RCRA FACILITY INVESTIGATION
REPORT

for

HAZ-MAT RESPONSE DISPOSAL, INC.

6300 Stadium Drive
Kansas City, Missouri 64129

December 1997

GENESIS Environmental & Safety Services, Inc.
1306 Wright Street
Pleasant Hill, Missouri 64080
816/540-2456

HAZ-MAT Response Disposal, Inc.
RCRA Facility Investigation Report

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LIST OF ACRONYMS AND ABBREVIATIONS

ASTM	American Society for Testing and Materials
bgs	Below ground surface
BNA	Base/Neutral Acid
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
CPR	Cardiopulmonary Resuscitation
CSR	Code of State Regulations
DEHP	bis(2-ethylhexyl)phthalate
DCP	Data Collection Plan
DMP	Data Management Plan
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
FSM	Field Site Manager
GC	Gas Chromatograph
Genesis	Genesis Environmental & Safety Services, Inc.
Haz-Mat	Haz-Mat Response Disposal, Inc.
HPLC	High-Performance-Liquid-Chromatographic
HSO	Health and Safety Officer
LEL	Lower Explosive Limit
MCL	Maximum Contaminant Level
MDNR	Missouri Department of Natural Resources
mg/kg	Milligram per Kilogram
mg/L	Milligram per Liter
ml	Milliliter
MS	Matrix Spike
MSD	Matrix Spike Duplicate

LIST OF ACRONYMS AND ABBREVIATIONS CONTINUED

NPDES	National Pollutant Discharge Elimination System
PAH	Polycyclic Aromatic Hydrocarbon
PIC	Principal-in-Charge
PID	Photoionization Detector
PM	Project Manager
PMP	Project Management Plan
ppm	Parts per million
PVC	Polyvinyl Chloride
QA	Quality Assurance
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	Quality control
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SCP	Spill Containment Pond
SHSP	Site Health and Safety Plan
SHSS	Site Health and Safety Supervisor
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
SW-846	Test Methods for Evaluating Solid Waste Physical/Chemical Methods - Third Edition
TCA	1,1,1-trichloroethane
TOC	Total Organic Carbon
TSCA	Toxic Substances Control Act
µg/kg	Microgram per Kilogram
µg/L	Microgram per Liter
$\mu g/cm^2$	Microgram per Square Centimeter
U.S.	United States

LIST OF ACRONYMS AND ABBREVIATIONS CONTINUED

USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
VOC	Volatile organic compound

* * * * *

1.0 INTRODUCTION

1.1 PURPOSE

This document presents the results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) for HAZ-MAT Response Disposal, Incorporated (Haz-Mat) in Kansas City, Missouri (referred to hereinafter as Facility, Site, or Haz-Mat). This RFI Report describes the effort necessary for investigating two solid waste management units (SWMUs). The secondary containment structure for the bulk storage tanks (SWMU 4) and the loading/unloading bay and adjacent parking area (SWMU 8) immediately north of the Haz-Mat waste management building are the SWMUs of concern specified in the Facility's permit ("Corrective Action" section, I.A., page 69 of 84). The SWMU 8 loading dock area and parking lot area are discussed separately in this report.

The RFI was undertaken to determine if there was any environmental contamination that may have impacted the surface soil, subsurface soil, and groundwater quality at the Facility. This RFI Report was prepared with Haz-Mat in accordance with Missouri Department of Natural Resources (MDNR) requirements as specified in the Facility's RCRA permit.

1.2 BACKGROUND

1.2.1 General Description

Haz-Mat currently operates a commercial hazardous waste treatment, storage, and disposal (TSD) facility. The site is located in the East 1/2 of the Northwest 1/4 of Section 24, Township 49 North, Range 33 West in Jackson County. The approximate geographic coordinates for the site are 94° 30' 34" longitude, 39° 03' 30" latitude. A topographic map providing an overview of the general location of the site is presented as Figure 1-1. The mailing address and street address for the facility is as follows:

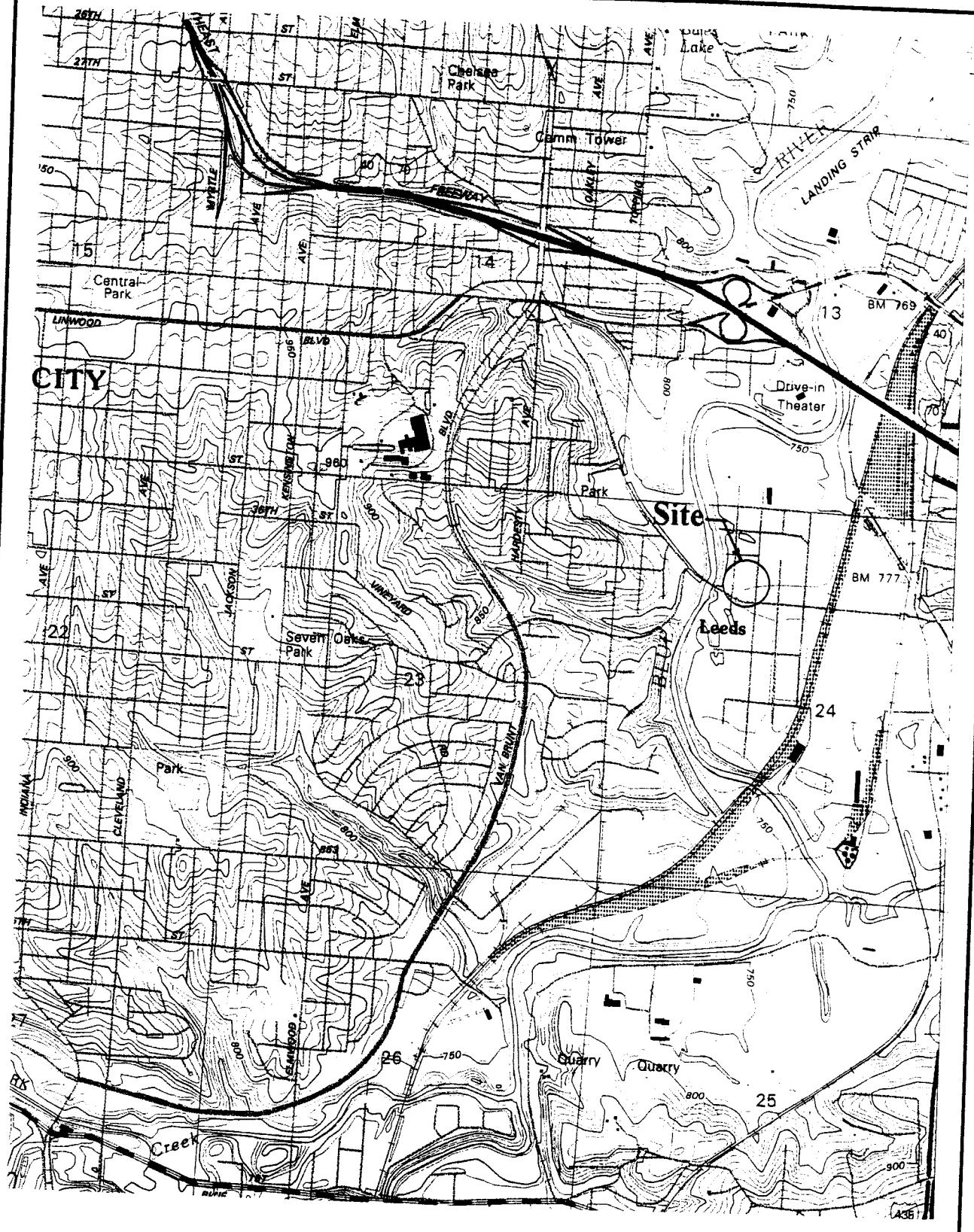
Haz-Mat Response Disposal, Inc.
6300 Stadium Drive
Kansas City, Missouri 64129

A variety of solid, sludge, and liquid wastes regulated under the authority of RCRA are managed at the facility. A listing of the waste materials accepted at the facility is provided in the Facility's Consolidated Permit issued February 3, 1997. Some of the waste materials are blended to produce a waste derived fuel, suitable as a fuel source for boilers and industrial furnaces, such as cement kilns and metal forging furnaces. There are environmental benefits from this practice; a reduction in consumption of natural resources and, of course, no long term management of the waste (i.e., landfill maintenance & closure requirements). Hazardous wastes determined to be inappropriate for blending into fuels are shipped off site for proper treatment/disposal. No wastes are disposed at the Site. All wastes are ultimately shipped off-site (including waste derived fuels). Hazardous waste is also stored in containers and tanks by Haz-Mat.

The main building at the Facility provides a total of 9,733 square feet of waste management, laboratory, and office space. The building is one story tall, and is constructed of masonry walls. The roof is supported in part of the building by steel bar joists and by wood trusses in the remainder of the structure. The building is divided into separate areas for hazardous waste storage, processing, and staging for production. The storage areas for both hazardous and non-hazardous waste are segregated by waste type (i.e., flammable, corrosive, oxidizers, etc.). Waste storage areas within the Facility are equipped with concrete curbing for spill containment. Bulk tank storage areas have secondary containment provided by reinforced concrete walls. The containment walls for hazardous waste storage tanks will be constructed to a height of 767 feet above mean sea level (MSL) - one foot above the 100-year flood elevation of 766 feet. Currently the walls provide sufficient containment capacity, but are not high enough to prevent flood water from overtopping the walls (i.e., in a 100-year flood event).

A second building at the Facility is used as a locker room for plant personnel and as a maintenance building. The building, formerly an Amoco gas station, is located immediately to the east of the primary building. See Figure 1-2, Facility Drawing, for the Facility layout.

A perimeter chain link security fence surrounds the facility at the property line. Three fence gates provide access to the property, two gates for vehicle entry and one gate for employee



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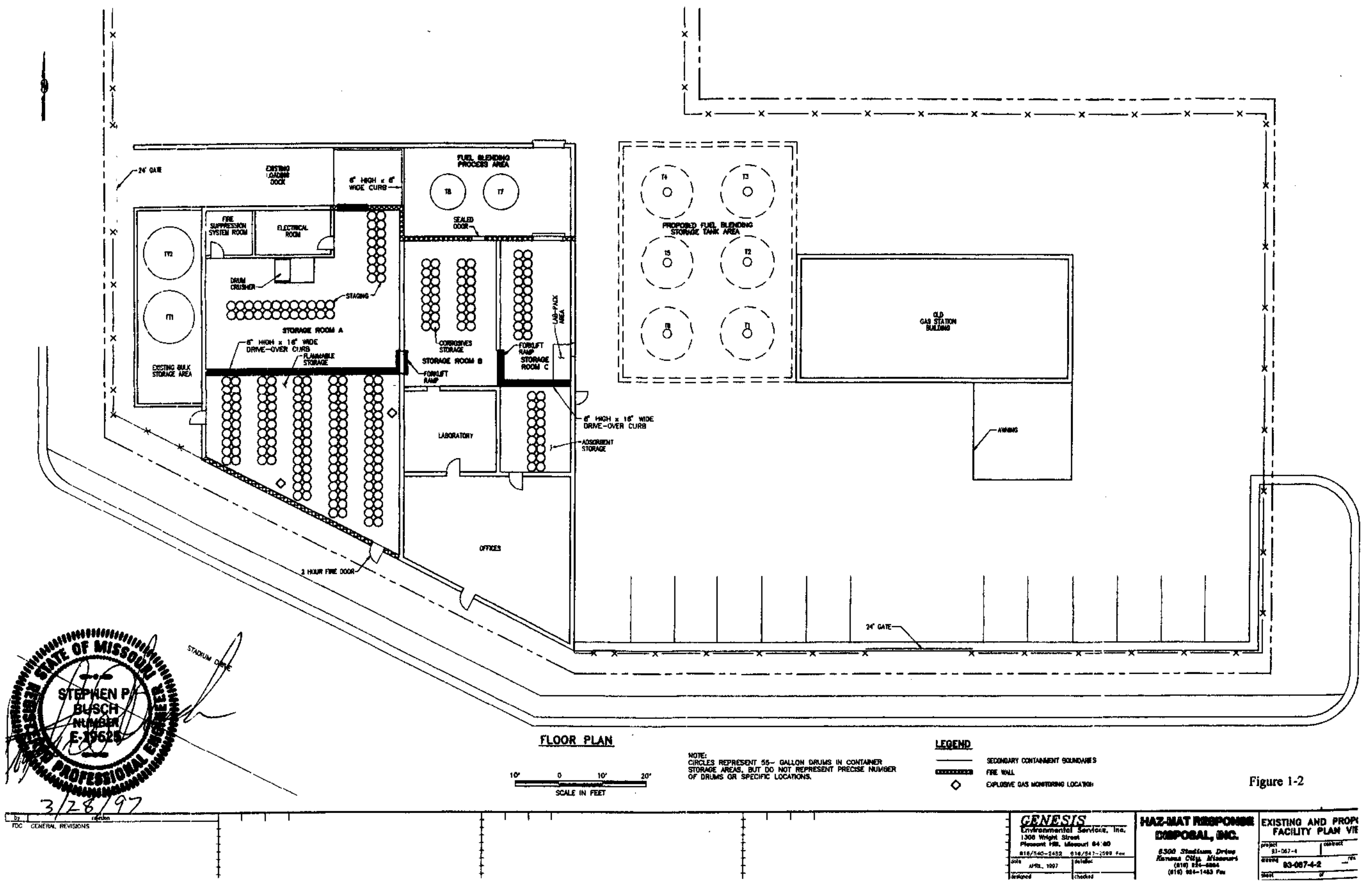
GENESIS
Environmental
& Safety Services, Inc.
Pleasant Hill, Missouri

Figure 1-1

Site Location Map - Topographic

Haz-Mat Disposal Response, Inc.

Kansas City, Missouri



FUEL BLENDING PROCESS AREA
EXISTING LOADING DOCK
PROPOSED FUEL BLENDING STORAGE TANK AREA
OLD GAS STATION BUILDING
STORAGE ROOM A
STORAGE ROOM B
STORAGE ROOM C
CORROSIVES STORAGE
FLAMMABLE STORAGE
LABORATORY
OFFICES
ABSORBENT STORAGE
EXISTING BULK STORAGE AREA
FIRE SUPPRESSION SYSTEM ROOM
ELECTRICAL ROOM
DRUM CRUSHER
STAGING
SEALED DOOR
AWNING
24' GATE
3 HOUR FIRE DOOR
STADIUM DRIVE
6" HIGH x 16" WIDE DRIVE-OVER CURB
6" HIGH x 6" WIDE CURB
FORKLIFT RAMP
LAB-PACK AREA
FLOOR PLAN
NOTE:
CIRCLES REPRESENT 55- GALLON DRUMS IN CONTAINER STORAGE AREAS, BUT DO NOT REPRESENT PRECISE NUMBER OF DRUMS OR SPECIFIC LOCATIONS.
10' 0 10' 20'
SCALE IN FEET
LEGEND
SECONDARY CONTAINMENT BOUNDARIES
FIRE WALL
EXPLOSIVE GAS MONITORING LOCATION
STATE OF MISSOURI
STEPHEN P. BUSCH
NUMBER E-19625
REGISTERED PROFESSIONAL ENGINEER
3/28/97
GENESIS
Environmental Services, Inc.
1300 Wright Street
Pleasant Hill, Missouri 64080
816/540-2452 816/547-2599 Fax
date APRIL, 1997
HAZ-MAT RESPONSE DISPOSAL, INC.
6300 Stadium Drive
Kansas City, Missouri
EXISTING AND PROPO
FACILITY PLAN VIE
project 93-067-4
drawing 93-067-4-2

Figure 1-2

personnel use. Visitors are required to enter through the front door of the main building (i.e., the main office area of the facility.

1.2.2 Surrounding Land Use

Haz-Mat is located in an area of Kansas City that is primarily used for industrial and commercial purposes. Historically this has been an area of mixed zoning; however. The area to the north of the Facility is residential. East of the Facility is primarily commercial facilities. The former GM Leeds plant (no longer used for automobile assembly; leased for miscellaneous use) is about ¼ mile east of the Site. South across Stadium Drive is commercial properties. The lot to the west of Haz-Mat is currently vacant. The lot had been a body shop and salvage yard in the recent past. Buildings were razed on this lot. The Blue River is about 100 yards to the west of the Facility.

The area was developed many years ago. The per capita income for the area is below average according to U.S. Census Data. There is not significant new development in the area. Additional information on the demographics of the area can be found in the Haz-Mat Health Profile.

1.2.3 Topography

Stormwater runoff at the Facility, associated with non-waste management areas, drains from the Site and is collected by the curb and gutter system associated with the City stormwater collection system. Stormwater collected in secondary containment areas (around processing and storage tanks) is allowed to evaporate (small quantities) or is evaluated and processed in accordance with environmental regulatory requirements.

The Facility is very level. The elevation of the property, areas not associated with structures, varies from about 760 feet above MSL to about 762 feet above MSL (i.e., low point to high point). Figure 1-1 shows the topography, which controls the natural, surface water drainage directions in the Facility.

1.2.4 Geology and Hydrogeology

This subsection describes the physical setting of the property in terms of geology, hydrogeology, and the associated potential for migration of contamination in the subsurface, should contamination occur.

1.2.4.1 Geology

The Haz-Mat Facility is located within the alluvial valley of the Blue River. Alluvial materials consist predominately of fine-grained material such as silty clay, clayey silt, and fine sands. Subsurface investigations of other locals near the Facility have shown the vertical extent of alluvial soils can be 50 to 60 feet below ground surface. Underlying the alluvial material is the Pennsylvanian bedrock comprised of shale and limestone.

1.2.4.2 Hydrogeology

The alluvial deposits that fill the Blue River Valley consist of clays and silts near the ground surface, and gradually coarsen downward to chert and limestone gravel just above the bedrock. Silts and clays commonly have relatively low permeabilities compared to coarse sands and gravels. Therefore, upper layers of silts and clays hinder vertical percolation and provide a confined-to-semiconfined aquifer, hence limiting vertical movement of groundwater. Subsurface investigations of other local facilities have shown saturated zones approximately 15 feet below the surface. The majority of the groundwater flow is expected to move horizontally through the gravel layer just above the bedrock toward the Blue River west of the site.

1.2.5 Solid and Hazardous Waste Treatment, Storage, and Disposal Areas

This Facility description is intended to provide an overview of the processes, activities, and wastes authorized for management by Haz-Mat. The Facility is a commercial treatment, storage, and/or disposal (TSD) facility. The vast majority of the waste materials managed at the site are generated offsite. A description of each generator's waste stream is provided in the Facility's operating record. This information can be very helpful in accessing the accuracy of a generator's waste classification. The types of waste managed at the Facility vary with time, based upon

demand. The operations and wastes Haz-Mat is authorized to manage at the Site are listed within the Consolidated Permit for the Facility.

Storage

The Facility has the capability to provide storage of both containerized waste and bulk shipments of waste (i.e., container storage and tank storage). Waste is accepted at the Facility and stored for treatment onsite (i.e., fuel blending) and/or for shipment offsite to another TSD facility. The Facility's RCRA Part B Permit authorizes storage of containerized and bulk waste in specific locations on site. This allows for segregation of wastes to prevent mixing of incompatible materials.

Fuel Blending

A significant portion of the waste materials managed at the site is processed in the Haz-Mat fuel blending program. Boilers and industrial furnaces (BIFs) throughout the United States typically use these waste derived fuels. Wastes are accepted for storage and blending to produce a specification fuel for energy reuse. Waste fuels are typically spent solvents or off-specification intermediates or products from various industries (e.g., the paint, ink, plastics, oils, petrochemical, pharmaceutical and coating industries, etc.). The Facility also processes solid wastes with potentially high heat content. These include waste activated carbon, petroleum refining residues, organic absorbents, solid residues from evaporation, distillation residue, and chemical coatings industry wastes. Solid waste fuels can be stored in both container and bulk quantities and can be processed in the fuel handling system.

Lab De-Packing

Haz-Mat accepts and manages hazardous waste in lab packs. The lab de-pack operation consists of re-containerizing and bulking of small containers of lab wastes into suitable containers for eventual treatment or disposal of the consolidated waste materials.

Used Oil Handling

Haz-Mat provides storage facilities and on-site blending of off-specification used oil as a liquid

waste. The Facility has the ability to manage both on-specification and off-specification used oil. On-specification used oils will be managed in accordance with Missouri (10 CSR 25-11.279). Off-specification used oils will be blended into hazardous waste fuels.

On-Site Generated Waste Handling

As a treatment and storage facility, Haz-Mat has waste management operations that require the use of personal protective equipment (PPE). Haz-Mat has the ability to containerize, store, and treat many of these on-site generated wastes. Wastes not amenable to treatment in Haz-Mat's waste management units will be shipped off-site to an appropriate TSD facility.

1.2.6 SWMU Information

SWMUs requiring further investigations identified by the Facility's permit include SWMU #4, the bulk tank area located west of the Facility's main building, and SWMU #8, the loading dock and adjacent parking lot located immediately to the north of the Facility's main building. The permit has specified the final RCRA Facility Assessment (RFA) Report dated January 9, 1992, specified further investigation was needed at these SWMUs. A copy of the Draft RFA Report dated September 24, 1991, has been made available to Haz-Mat. The Draft RFA Report states: "Conclusions and suggested further actions have been separated from the body of the report and are labeled "ENFORCEMENT CONFIDENTIAL." A copy of the final RFA Report has not been provided to Haz-Mat to date.

SWMU #4 Bulk Tank Storage Area

The RFA was performed when the Facility was under different ownership. At the time of the sampling bulk storage was accomplished by a compartmentalized tanker trailer in a concrete secondary containment structure. Since that time the tanker trailer has been removed and a new secondary containment structure constructed. Storage is accomplished with two 10,000 gallon welded steel tanks.

SWMU #8 Loading Dock and Adjacent Parking Lot

The RFA describes this area as "a relatively flat gravel parking lot." It is stated ... "This area

provides no secondary containment during loading and unloading." Based on the description and photocopies of photographs accompanying the RFA, it appears significant modifications have been made to this portion of the facility. No secondary containment is provided for the parking lot; however, a loading/unloading truck bay with secondary containment has been added to the west side of the dock area. Apparently trucks were loaded/unloaded on the north side of the dock (i.e., parking lot), prior to construction of the truck bay. This was prior to Haz-Mat ownership.

1.2.7 Preliminary Assessment For Nature And Extent Of Contamination

This preliminary assessment is based on information available in the Draft RFA Report only. It is intended to provide background information to help understand the rationale for the RFI sampling effort. RFI data will be used in an assessment of nature and extent of contamination later in this RFI Report.

The only available data that Haz-Mat is aware of for the SMWUs identified are the RFA sampling results. One sample was collected for the SWMU #4 (bulk tank area) and two samples (sample and duplicate) were collected at SWMU #8 (loading dock area). One sample was also collected from each of the four quadrants of the parking lot (SWMU #8). There was no data validation report available with the Draft RFA Report.

SWMU #4 Bulk Tank Area

The Bulk Tank Area is located on the west side of the main building at the facility. The RFA stated the sample was collected from the "area immediately surrounding the new secondary containment unit." Photo 1 shows SWMU 4 at about the time of the RFA. Photo 2 shows the current state of SWMU 4. No specific sampling location information was provided in the RFA Report. There were no elevated metals and no detected volatile organics in the sample collected at SWMU #4. There were detectable levels of three polycyclic aromatic hydrocarbons (PAHs). PAHs are products of incomplete combustion and are usually found in smoke and soot. These materials commonly combine with dust particles in the air and are transferred into the environment by this method. The materials detected were fluoranthene, benzo(a)anthracene, and benzo(b)fluoranthene at 5.1, 4.1, and 5.5 parts per million (ppm), respectively, in the soil sample

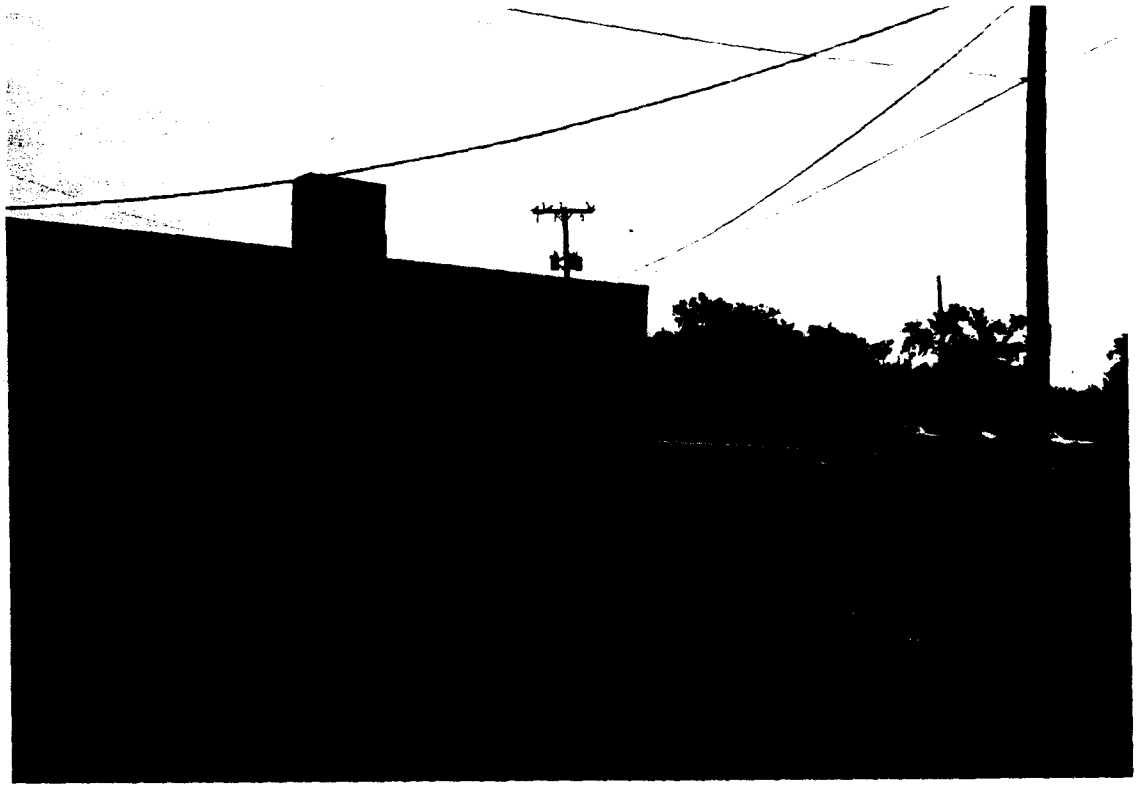


Photo 1 – SWMU 4, Under Previous Ownership in the Early 1990's

Photo 2 – SWMU 4, Haz-Mat Ownership, Recent Photograph 4/16/97

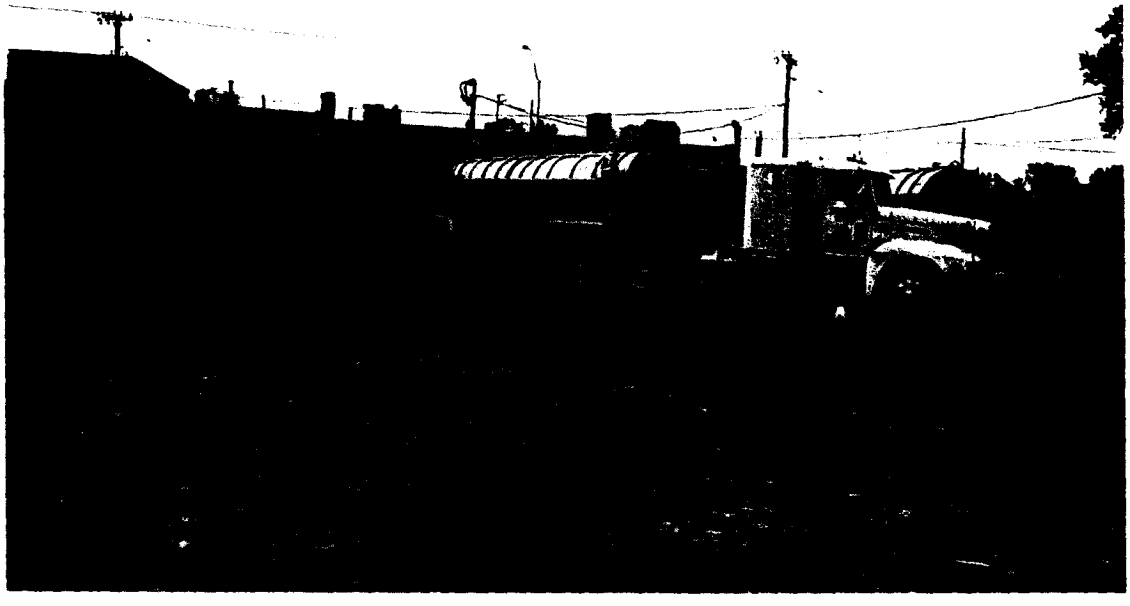


Photo 3 – SWMU 8, Under Previous Ownership in the Early 1990's
1990's Loading Dock & Parking Lot

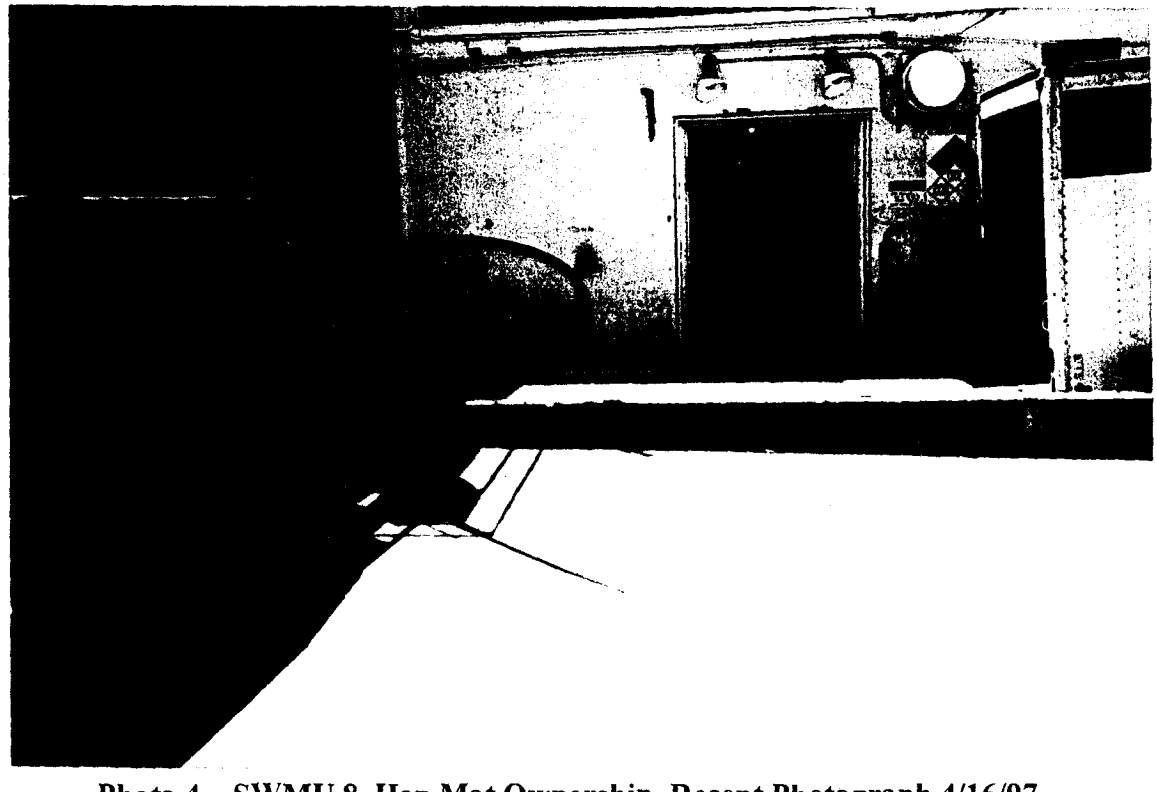


Photo 4 – SWMU 8, Haz-Mat Ownership, Recent Photograph 4/16/97
1990's Loading Dock Area

(the detection limit is assumed to be 3.3 ppm, although not specifically provided). These results will be discussed in greater detail in the discussion of results section of this report. Observations were made during the RFI field efforts that warrant discussion and relate to these RFA sampling results.

SWMU #8 Loading Dock and Parking Lot

The loading dock and parking lot is on the north side of the main building on the Facility. Photo 3 shows the north side of the facility at about the time of the RFA. The former loading dock area is shown in a recent photograph identified as Photo 4. RFA samples were collected at the former loading dock (in duplicate) and from each of the four quadrants of the parking area. Specific location details for the sampling was not provided in the RFA. No elevated metal levels were found in any of these samples collected. There were no detectable volatiles or semi-volatile compounds detected in three of the four parking lot quadrants.

One of the samples, collected from the northwest parking lot quadrant, had 170 µg/kg acetone in the sample. Acetone is a common solvent and a common laboratory contaminant. This sample also had 5,700 µg/kg bis(2-ethylhexyl)phthalate (DEHP). DEHP is one of the more common phthalate plasticizers. It is used in PVC and other plastics. DEHP can be released from plastic goods to the environment. It is not persistent in the environment under aerobic conditions (i.e., has a half-life of several hours in the atmosphere and several weeks in surface waters).

At the loading dock, the sample collected (and a duplicate) contained part per billion levels of 1,1,1-trichloroethane (TCA), 1,1,2,2-tetrachloroethene, and toluene. The Draft RFA Report stated that these "...volatiles were in the low ppb range, indicating past releases but probably not of a significant nature."

1.2.8 Potential Migration Pathways And Receptors

As discussed above, there were only minor concentrations of environmental contaminants found in a limited number of RFA samples collected at the Facility. Only two of the eight SWMUs investigated had detectable levels of environmental contaminants during the RFA. Where there

were detectable levels of contaminants only minor levels found. Pathways such as surface waters, groundwater, air, and soil are discussed below for the Facility. The discussion below considers RFA data only. These pathways will be re-evaluated using RFI data later in this report.

SURFACE WATER

Surface waters could be impacted from runoff or during a flood event if environmental contaminants are present. There was no evidence surface waters had been impacted in the past. Surface water most likely to be impacted is associated with the Blue River. The Facility is located in the Blue River Valley. The river channel has been significantly modified in recent years by the U.S. Army Corps of Engineers to prevent flooding in the metropolitan area. Discussions with personnel from the U.S. Army Corps of Engineers revealed that they felt the 100-year flood elevation had been substantially lowered in the vicinity of the Facility; however, this has not been verified since a hydrology study has not been performed. Therefore, officially the Facility remains in the 100-year floodplain; however, practically speaking there is doubt that the Facility is still in the 100-year floodplain.

SOILS

There was evidence of a "release" to the soil based on RFA data. Semi-volatile organic compounds (SVOCs) were found in two samples. SVOCs detected were PAHs and DEHP. PAHs are products of incomplete combustion. These materials could have been deposited as the result of combustion off site in this industrial area or the spreading of cinders . DEHP is a plasticizer and could have resulted from floating debris (during a flood event) or blowing liter and debris. Volatile organic compounds detected included acetone, TCA, 1,1,2,2-tetrachloroethene, and toluene. These are common solvents managed at the facility and could have resulted from a minor spill during loading/unloading vehicles at the Facility. The acetone was found in an area away from the main building on the facility. Acetone is also a common laboratory contaminant in environmental samples.

GROUNDWATER

The potential for release of contaminants (if present) to the groundwater from the soil is low due

to the very low levels of environmental contaminants present and due to the clays and silts found near the ground surface at the Facility. The SVOCs present are not particularly mobile in soil. The VOCs are more mobile; however, they were present only in low ppb levels.

AIR

Due to presence of low concentrations of volatiles, it appears that there is a low potential for releases to the air by volatilization. SVOCs attached to dust particles could be re-introduced to the air if the dust is disturbed and broadcast into the air. Paving portions of the parking lot has reduced this potential.

* * * * *

2.0 FACILITY INVESTIGATION

This Facility Investigation section presents a detailed description of the field investigation activities for the RFI at Haz-Mat (i.e., SWMU 4 and SMWU 8). The Facility Investigation section is divided into three separate subsections. "Data Collection," presents an overview of the data collection process. "SWMU Investigation Rationale and Sampling Objectives," presents the rationale and specific sampling activities at SWMU 4 and SWMU 8. Specific sampling methods and procedures are presented in "Field Sampling Activities."

2.1 DATA COLLECTION

A phased investigative approach was planned for the RFI to provide flexibility. The detail of information collected was increased or decreased to accommodate specific situations encountered during the field investigations. Yet there was a minimum acceptable number of samples. The samples specifically identified in the work plan were collected.

The fieldwork conducted during the investigation centered on confirming the presence or absence of contamination. If significant environmental contamination is present, then the extent of contamination needs to be defined. Migration pathways and potential receptors are important to define if contamination is found during the RFI.

The fieldwork planned during the RFI was divided into two categories: (1) RFI Action, and (2) Contingent RFI Action. RFI Action included investigation activities identified in this Work Plan. Contingent RFI Action included activities, which may or may not be necessary depending upon the results of the RFI Action. No Contingent RFI Action activities have been undertaken as part of the RFI to date because there was no sign of environmental contamination as a result of waste management activities.

2.1.1 Intended Uses For The Data

The data necessary to meet the RFI objectives was collected during the field investigation. This data was specified in the Project Management Plan of the RFI Work Plan. The Work Plan was

reviewed and approved by the Missouri Department of Natural Resources (MDNR) and the U.S. Environmental Protection Agency (EPA). Also, the data collected could support the development and evaluation of potential corrective measure alternatives if necessary.

2.1.2 Overview Of Sampling Rationale

An overview of the sampling plan rationale is discussed in this section. Sampling rationale for SWMU 4 and SWMU 8 is discussed in Chapter 2.0.

2.1.2.1 Media of Interest

Media of interest included surface or near surface soil and subsurface soil for the RFI. Surface soil samples aided in the characterization of the site according to the presence or absence of environmental contamination. If contamination is detected subsurface soil samples will help define the extent of migration. Groundwater was not investigated during this phase of the RFI. The media sampled included surface soil and subsurface soil samples only as part of this RFI effort.

2.1.2.2 Sampling Locations

Sampling locations were selected based upon existing historical information. Topographic features such as direction of surface water runoff were taken into consideration when selecting sampling locations. Specific sampling locations are discussed later in this section of the EFI Report.

2.1.2.3 Analytical Parameters

A variety of analytical parameters can be collected in conjunction with an RFI. Chemical analyses are collected to determine if contamination is present at specific locations. Physical/chemical analyses of media are necessary if contamination is present to help define pathways, migration potential, and potential corrective actions. Field measurements are used to support the health and safety plan and also help determine when or where environmental actions should be taken.

Contaminant Chemical Analyses

Many types of solid and hazardous wastes are generated, stored, and managed at the Facility. The waste constituents associated with the Facility include VOCs, SVOCs, and RCRA metals. The RFI is being initiated primarily due to concerns about the presence of SVOCs and VOCs. Chemical analytical parameters were selected based on past contaminants detected or contaminants anticipated due to past operations or waste management practices. Appendix A, Analytical Methods & List of Analytes, lists the analytical parameters associated with the chemical analyses. Appendix A is provided within this document at the end of the RFI Report.

Soils Physical/Chemical Analyses

Soil samples were collected for analyses of physical and chemical properties. Soil samples were collected to better characterize the physical and chemical properties at the Facility. Methods for taking the soil samples and a list of analyses to be conducted are included in subsection 2.3.2.4 of this report. The sample for physical/chemical analyses was composited from equal aliquots of soil collected from each sampling point. This was decided as a result of field observations. We believe this better characterized the soils of the Facility and provided information on the average soil properties which may affect contaminant fate and transport. Information about physical and chemical properties of the soil also helps to support the development for corrective action, if necessary.

Field Measurements

In addition to samples sent to laboratories for chemical analyses, measurements were taken in the field. Field monitoring equipment (i.e., photoionization detector - PID and lower explosive level meter - LEL meter) were used for health and safety precautions and to identify specific portions of soil samples to be collected and analyzed.

2.1.3 Quality Control Parameters

The quality assurance (QA) objective for analytical data was to collect environmental monitoring data of known and acceptable quality. To meet this objective, the following quality control (QC) parameters were addressed:

- Precision
- Accuracy
- Representativeness
- Completeness
- Comparability

Each of these parameters are briefly discussed in the following subsections. They were also addressed in the QAPP in the RFI Work Plan. An assessment of these parameters is provided with the analytical results in Chapter 3 of this report.

2.1.3.1 Precision and Accuracy

The precision and accuracy quality limits (in terms of spike recoveries, duplicates, etc.) that analytical data must meet to be considered acceptable are established in *Test Methods for Evaluating Solid Waste--Physical/Chemical Methods - Third Edition* (SW-846). The relative percent difference (RPD) between the matrix sample and its duplicate for each parameter measured were compared to the precision limits established in SW-846.

The control limits specified above for accuracy and precision were utilized to identify outliers (data results outside the specified control limits). If any outliers occurred or if contamination was detected in the blanks, the corresponding analysis results was flagged.

Duplicate or co-located samples were collected in the field to evaluate the precision of field sampling techniques. The primary objective of field measurements was to obtain reproducible measurements to a degree of accuracy consistent with the limits imposed by the intended use of the data. Thus, quality control procedures for field measurements were limited to checking the reproducibility of field measurements by taking readings and by calibration of instruments.

2.1.3.2 Representativeness

The objective in addressing representativeness was to assess whether the information obtained

during the investigation accurately represents the actual site conditions. Requirements of representativeness were determined during the planning stages of the RFI and were reflected in the DCP approach. Representativeness was assessed after initial data validation and reduction and was based only on validated data.

2.1.3.3 Completeness

The objective for completeness is to provide sufficient valid data to meet the goals of the RFI. Completeness was assessed by comparing the number of valid sample results to the number of samples collected. Specific completeness goals were provided in the QAPP of the approved RFI Work Plan.

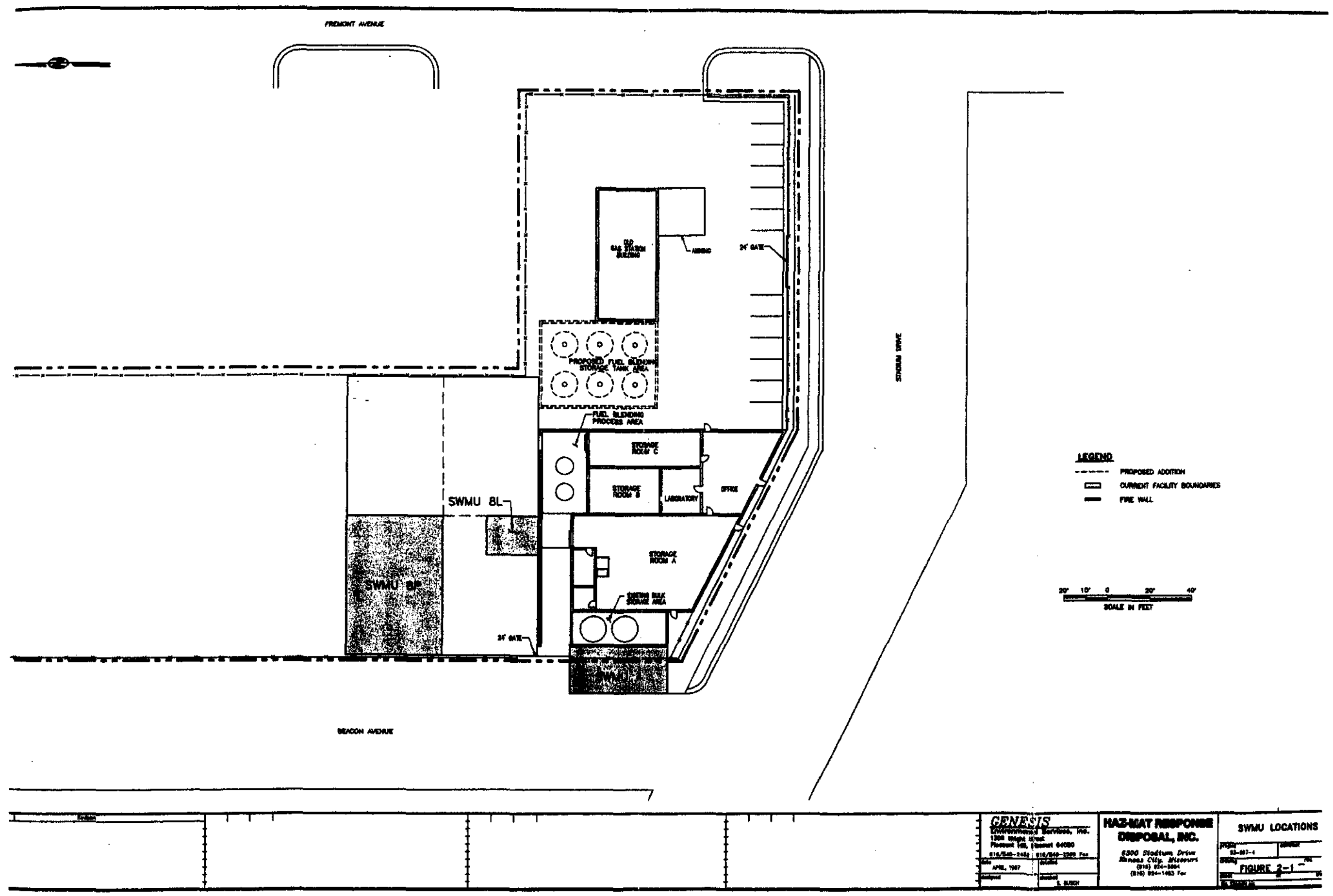
2.1.3.4 Comparability

The objective of comparability is to establish that the data developed during the investigation are comparable with applicable criteria and with data available from other scientific studies in the area. Both field and analytical procedures will follow standard methods. This includes field sampling and measurements, sample analyses methods, and required detection limits. This comparison includes the evaluation of previously collected data and data sets that may be collected in the future.

2.2 SWMU INVESTIGATION RATIONALE AND SAMPLING OBJECTIVES

A discussion of the SWMU field investigation is presented in this section of the RFI Report. This includes the investigation rationale and specific RFI actions. This section of the Report includes a presentation on environmental media sampled, specific sampling locations, uses of the data, representativeness of the sampling, and sample analytical parameters. Contingent RFI actions, which would have occurred if information gained during the RFI suggested the need, has not been require to date. Figure 2-1, SWMU Locations, is a Facility map, which identifies site features and the SWMUs that were investigated.

The specific sampling locations selected during the RFI were as proposed basically; however, minor adjustments were made in the SWMU 8 Loading Dock Area due to concerns of



FREMONT AVENUE
OLD GAS STATION BUILDING
AWNING
24' GATE
STADIUM DRIVE
PROPOSED FUEL BLENDING STORAGE TANK AREA
FUEL BLENDING PROCESS AREA
STORAGE ROOM C
STORAGE ROOM B
LABORATORY
OFFICE
STORAGE ROOM A
EXISTING BULK STORAGE AREA
SWMU 8L
SWMU 8F
24' GATE
BEACON AVENUE
LEGEND
PROPOSED ADDITION
CURRENT FACILITY BOUNDARIES
FIRE WALL
20' 10' 0 20' 40'
SCALE IN FEET
GENESIS
APRIL, 1997
S. BUSCH
HAZ-MAT RESPONSE DISPOSAL, INC.
6300 Stadium Drive
Kansas City, Missouri
SWMU LOCATIONS
FIGURE 2-1

underground telephone lines and the sewer line. Other sampling locations were as proposed in the RFI Work Plan. The precise locations of sample collection are described in relationship to a permanent structure or structures.

2.2.1 SWMU 4 – Former Bulk Tank Area

2.2.1.1 Background/Rationale

The Former Bulk Tank Area is located on the west side of the main building at the Haz-Mat Facility at the same location as the current or existing bulk tank storage area, see Figure 2-1. Historically, a five-compartment tanker trailer was placed at this location to store blended wastes. The tanker had an 8,250 gallon capacity. Compartment sizes ranged from 1,000 gallons to 2,450 gallons. The tank was constructed of 3/16-inch aluminum. This tank may have been operated at one time without secondary containment, according to the RFA Work Plan. This was not clearly specified in that plan. Apparently it was operated with a secondary containment system for the period immediately preceding its closure. Closure of this area consisted of removal of the tanker and demolition of the original, concrete secondary containment structure.

Another concrete secondary containment structure was constructed for the two 10,000 gallon storage tanks that are currently in place. This containment structure was constructed prior to RFA sampling. Apparently samples were collected from outside the existing containment wall and composited into one sample. Specifics on the sampling location where not provided in the RFA. There is a sidewalk outside the containment wall, immediately adjacent to it. There is no evidence the sidewalk was penetrated during the sampling, therefore it is assumed samples were collected to the west of the sidewalk in a graveled area. No VOCs were detected and there were no elevated metals in the RFA samples. Three SVOCs were detected in the sample. The three compounds detected were fluoranthene (at 5.1 ppm), benzo(b)fluoranthene (at 5.5 ppm), and benzo(a)anthracene (at 4.1 ppm). Based on information in the RFA, it appeared the PAHs were detected slightly above their detection limit of approximately 3.3 ppm. These compounds are classified as polycyclic aromatic hydrocarbons (PAHs). PAHs are formed during combustion processes. The materials can combine with dust or soot particles and be dispersed in the air prior

to being deposited in water or soil. Other rationale for the presence of these compounds was found during the RFI. This will be discussed later in this report.

2.2.1.2 RFI Action at SWMU 4

Two soil sampling locations were selected to collect near surface and subsurface samples at each location. The specific locations are shown on Figure 2-2. These sampling points were field located using the procedures outlined in section 2.3.3 of this report. Locations for the samples were selected to provide the data points for this area. The near surface sample (S4-1-01) from location S4-1was collected immediately below the gravel pack/cover at a depth of 24- to 27-inches below ground surface (bgs). The subsurface sample (S4-1-02) was collected at a depth of 48- to 51-inches bgs. The near surface sample (S4-2-01) from location S4-2was collected immediately below the gravel pack/cover at a depth of 24- to 27-inches below ground surface (bgs). The subsurface sample (S4-2-02) was collected at a depth of 48- to 51-inches bgs.

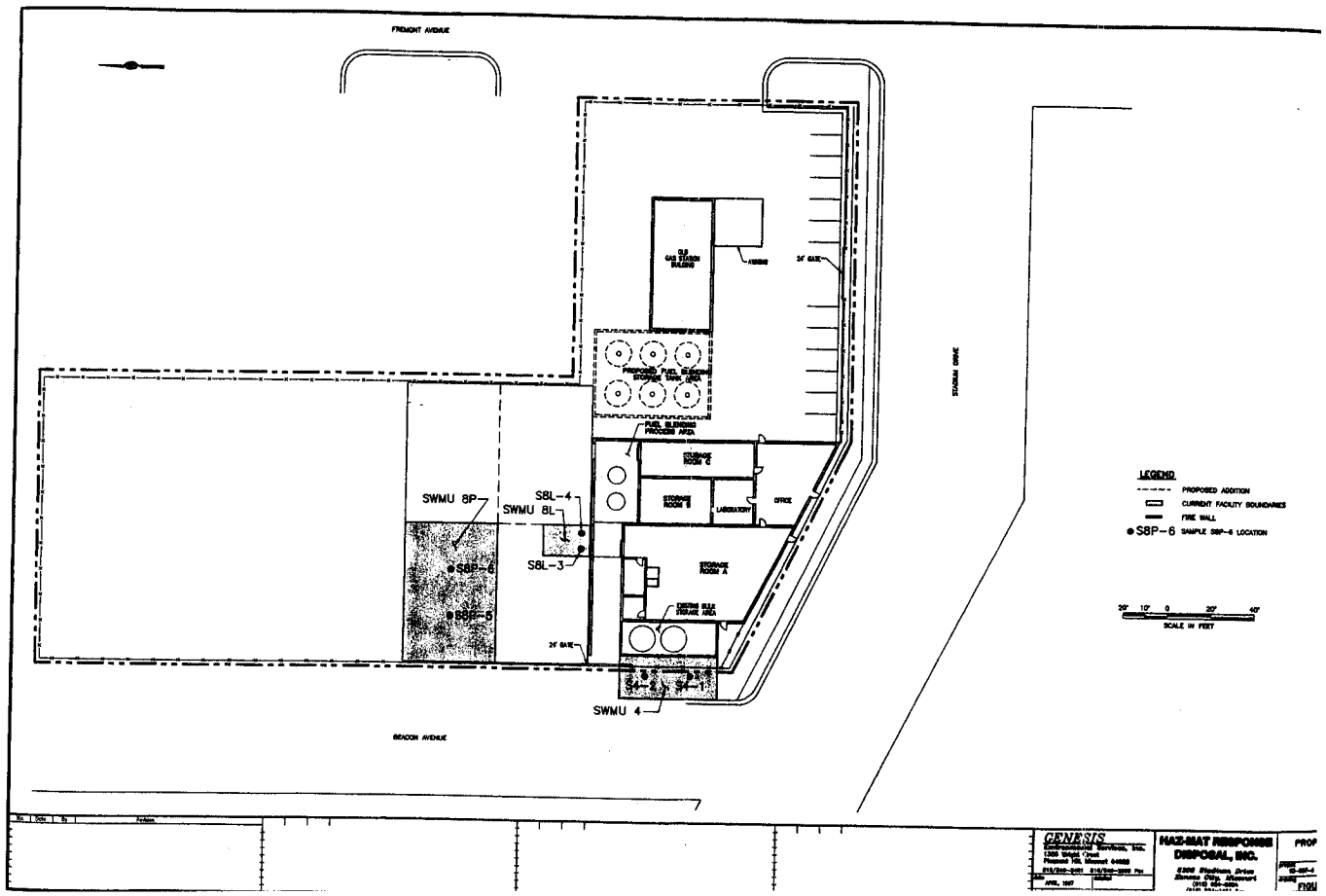
These samples were analyzed for VOCs, SVOCs, and RCRA metals. Photoionization detector (PID) readings were collected and recorded at the sampling location. No elevated PID readings above background were observed at this SWMU; therefore, additional samples were not collected for analysis. Table 2-1 provides a summary of samples and analyses. Sampling procedures are described in section 2.3.2.

2.2.2 SWMU 8 – Loading Dock

2.2.2.1 Background/Rationale

The Loading Dock and Parking Area sampled during the RFA has been modified since that 1991 sampling effort. At the time of the RFA the Loading Dock and Parking Area was a contiguous level area to the north of the main building, see Figure 2-1. The area was an unpaved, gravel lot with no secondary containment. Since that time a concrete loading area with secondary containment has been constructed.

During the RFA, two samples were collected at the Loading Dock, a sample and duplicate (co-located). Part per billion (ppb) levels of VOCs were detected in these samples. Both Loading



GENESIS

HAZ-MAT RESPONSE DISPOSAL, INC.

Table 2-1

Sampling Summary

Matrix	SWMU No.	Sample Point	Sample No.	Sample Depth	VOC	SVOC	Metals
Soil Samples	S4	1	01	24" to 27"	1	1	1
	S4	1	02	48" to 51"	1	1	1
	S4	2	01	24" to 27"	1	1	1
	S4	2	02	48" to 51"	1	1	1
	S8L	3	01	24" to 27"	1	1	1
	S8L	3	02	48" to 51"	1	1	1
	S8L*	4	01	32" to 36"	1	1	1
	S8L	4	02	54" to 57"	1	1	1
	S8P	5	01	24" to 27"	1	1	1
	S8P	5	02	48" to 51"	1	1	1
	S8P	6	01	24" to 27"	1	1	1
	S8P	6	02	48" to 51"	1	1	1
Subtotal					12	12	12

QA/QC Samples	SWMU No.	Sample Point	Sample No.	Sample Depth	VOC	SVOC	Metals
Field Duplicates*	S9L*	4	01	32" to 36"	1	1	1
MS/MSD	S8L	3	01MS/MSD	24" to 27"	1	1	1
Rinsate	S8L	3	02R	NA	1	1	1
Trip Blank	TB	10/14	01	NA	1	0	0
Subtotal QA/QC Samples					4	3	3

	VOC	SVOC	Metals
Total Field & QA/QC Samples	16	15	15

* Sample numbers S8L-4-01 and S9L-4-01 are duplicate/co-located samples

Dock samples contained 1,1,1-trichloroethane (TCA); 1,1,2,2,-tetrachloroethene (Perc); and toluene. Average concentrations detected were 13 ppb TCA, 14 ppb Perc, and 29 ppb toluene. One of the two samples collected at the Loading Dock also contained 4-methyl-2-pentanone (i.e., methyl isobutyl ketone or MIBK) at 45 ppb. All these compound are common solvents that would be expected to be managed at the Facility.

2.2.2.2 RFI Action at SWMU 8 – Loading Dock

Two sampling locations were selected to collect four samples (i.e., a near surface and subsurface sample at each location) in the old Loading Dock Area as shown on Figure 2-2. These samples will be field located using the procedures outlined in section 2.3.3. Locations for the samples were selected to provide the data points for this area. The near surface sample (S8L-3-01) from location S8L-3 was collected immediately below the gravel pack/cover at a depth of 24- to 30-inches below ground surface (bgs). The subsurface sample (S8L-3-02) was collected at a depth of 48- to 52-inches bgs. The near surface sample (S8L-4-01) from location S8L-4 was collected immediately below the gravel pack/cover at a depth of 32- to 36-inches below ground surface (bgs). The subsurface sample (S8L-4-02) was collected at a depth of 54- to 57-inches bgs.

These samples were analyzed for VOCs, SVOCs, and RCRA metals. Photoionization detector (PID) readings were collected and recorded at the sampling location. If elevated PID readings above background would have been observed at locations other than those specified, additional samples would have been collected for analysis. Elevated PID readings were not observed. Table 2-1 provides a summary of samples and analytes. Sampling procedures are described in section 2.3.2.

2.2.3 SWMU 8 – Parking Area

2.2.3.1 Background/Rationale

As mentioned above the Loading Dock and Parking Area sampled during the RFA has been modified since that 1991 sampling effort. At the time of the RFA the Loading Dock and Parking Area was a contiguous level area to the north of the main building, see Figure 2-1. The area was an unpaved, gravel lot with no secondary containment. Since that time a concrete loading area or

truck bay with secondary containment has been constructed. A portion of the parking area immediately adjacent to the truck bay has been paved with bituminous concrete (i.e., black top).

The Parking Area was divided into quadrants and four samples were collected during the RFA, one in each quadrant. There were no detectable VOCs or SVOCs in three of the four samples. There were no elevated metal concentrations in any of the samples. The northwest (NW) quadrant had 170 ppb acetone and 5.7 ppm bis(2-ethylhexyl)phthalate [also known as di(2-ethylhexyl)phthalate or DEHP]. Acetone is a common solvent. It is used extensively in laboratories. Acetone can show up as a false positive in environmental samples due to the extensive use in laboratories. DEHP is a common plasticizer. It is used in PVC and other plastic products.

2.2.3.2 RFI Action at SWMU 8 – Parking Area

Two sampling locations were selected to collect four samples (i.e., a near surface and subsurface sample at each location) in the NW quadrant of the old Parking Area as shown on Figure 2-2. These samples will be field located using the procedures outlined in section 2.3.3. Locations for the samples were selected to provide the data points for this area. The near surface sample (S8P-5-01) from location S8P-5 was collected immediately below the gravel pack/cover at a depth of 24- to 27-inches below ground surface (bgs). The subsurface sample (S8P-5-02) was collected at a depth of 48- to 51-inches bgs. The near surface sample (S8P-6-01) from location S8P-6 was collected immediately below the gravel pack/cover at a depth of 24- to 27-inches below ground surface (bgs). The subsurface sample (S8P-6-02) was collected at a depth of 48- to 51-inches bgs.

These samples were analyzed for VOCs, SVOCs, and RCRA metals. Photoionization detector (PID) readings were collected and recorded at the sampling location. If elevated PID readings above background would have been observed at locations other than those specified, additional samples would have been collected for analysis. Elevated PID readings were not observed. Table 2-1 provides a summary of samples and analytes. Sampling procedures are described in section 2.3.2.

2.2.4 Contingent RFI Action

As discussed in the RFI Work Plan, Project Management Plan (PMP), a preliminary assessment was made of the field data during the RFI investigation. No environmental contamination resulting from waste management activities was observed. If contamination had been detected, an interim data document would have been submitted to MDNR and EPA. No proposed additional field investigative activities, defined as Contingent RFI Action, were recommended or undertaken during the RFI. For example, Contingent RFI Action including additional sampling to determine both the horizontal and vertical extent of contamination or additional analyses were recommended during the RFI.

2.3. FIELD SAMPLING ACTIVITIES

2.3.1 General

This section of the RFI report presents the details of the specific field investigation activities for collection of Surface Soil/Sediment Sampling. In addition, equipment decontamination procedures, methods for disposing of investigation derived wastes, and sample handling/chain-of-custody procedures are presented.

2.3.1.1 Health and Safety

Sampling personnel proceeded in accordance with the SHSP and Haz-Mat safety protocol. Upon arrival at the sampling location, sampling personnel recorded the time, location, and weather conditions in the field logbook. Sampling personnel were suited at the level of protection specified in the SHSP.

2.3.2 Surface Soil Sampling Procedures

2.3.2.1 General

Modifications of the sampling procedures presented in the RFI Work Plan were necessary due to Site characteristics. This was required due to the depth of gravel pack and fill material on the surface at sampling locations. Sampling procedures employed are described below

2.3.2.2 Surface Soil Sampling

The collection of surface soil/sediment samples from areal locations was done according to the following procedures:

1. All surface material (e.g., gravel, asphalt, etc.) was removed with a backhoe. A trench was dug to approximately 5-feet deep. PID and LEL meters were used to check for environmental contamination.

2. A clean stainless steel spoon was used to remove approximately one inch of soil from the side wall of the trench at the desired sampling point.

3. Another clean stainless steel spoon was then be used to collect the soil sample from the underlying surface. The near surface sample was collected immediately below the gravel pack or fill material in native soil. Samples were placed in a clean stainless steel bowl.

4. The sampler, wearing clean disposable gloves, examined the sample for sticks, rocks, and other debris. Debris was not included in soil samples being placed in the appropriate sample containers as specified in Table 2-2. Soil samples to be analyzed for VOCs were placed in sample containers immediately. The remaining soil was mixed in the stainless steel bowl prior to placing soil in containers to be evaluated for SVOCs and metals.

5. Described sample in field logbook. Filled out labels and placed samples immediately in a cooler on ice.

6. Repeated procedures above for subsurface soil sample collection. Subsurface soil samples were collected from the side wall of the same sampling trench, immediately below (vertically) the near surface soil sample. The sampling trench was backfilled with stockpiled soil/sediment.

Table 2-2

Soil Samples

Analytical Methods, Containers, Preservation, & Holding Times

Haz-Mat RFI

Parameter	Analytical Method*	Sample Containers**	Sample Preservation***	Holding Times****
VOCs	8260A	4 oz. Clear, teflon lid liner	Cool	14 days
SVOCs	8270B	8 oz. Clear	Cool	14 days/40 days
RCRA Metals				
Ba, Cd, Cr, Ag	6010A	8 oz. Clear	Cool	6 months
As	7060A	8 oz. Clear	Cool	6 months
Pb	7421	8 oz. Clear	Cool	6 months
Hg	7471A	8 oz. Clear	Cool	28 days
Se	7740	8 oz. Clear	Cool	6 months

* All analytical methods from SW-846

** All containers are wide-mouth glass jars

*** Cool = 4 degrees Celcius

**** all times are for analysis except for SVOC. SVOC = extraction time/analysis time

For samples being sent to the analytical laboratory, ice was replaced as necessary prior to shipment. An entry was made on the chain-of-custody record for every sample and the chain-of-custody record was included in the cooler being shipped. Refer to section 2.3.7 for additional information concerning sample custody and documentation.

2.3.2.3 Quality Control Samples for Surface Soil/Sediment

Quality control samples included one duplicate sample, one equipment rinsate blank, and one matrix spike/matrix spike duplicate (MS/MSD). A trip blank accompanied the cooler (i.e., only one cooler required to ship all samples) containing samples for VOC analysis.

Equipment Rinsate Blanks

An equipment rinsate blank was prepared for the sampling equipment used to collect samples for chemical analyses. The following procedure was used to prepare equipment rinsate blank:

1. High-Performance-Liquid-Chromatographic (HPLC)-grade water (American Standards for Testing and Materials [ASTM] Type II) was used to rinse the properly decontaminated sampler or device used to retrieve the sample.

2. The rinsate was then placed into the containers specified in Table 2-2 for unfiltered groundwater samples. The equipment rinsate blank was analyzed for the same parameters as the primary sample.

Duplicate Sample

A duplicate sample was prepared for the surface soil/sediment sampling point designated as S8L-4. This sample was collected from the same interval in the sampling equipment as the primary sample (S8L-4-01). The sample was split with a decontaminated sample spoon. The two sample portions were placed in separate sample containers and treated independently of each other. One sample is considered as the original (S8L-4-01) while the other is the duplicate, or co-located sample (S9L-4-01). The duplicate sample was identified with a unique sample identification number (S9L-4-01) as specified in section 2.3.6, and the location where the duplicate was

collected was documented in the field logbook. The duplicate was analyzed for the same constituents as the sample being duplicated.

Matrix Spikes and Matrix Spike Duplicates

An additional sample was collected at sampling location S8L-3 so the analytical laboratory had the necessary soil for completion of an MS/MSDs. The additional soil sample was collected as part of the original sample S8L-3-01. The chain-of-custody record was completed to notify the laboratory that the MS/MSD was to be completed in addition to the analytical parameters specified. MS/MSDs were completed for the same parameters as the original sample.

Trip Blanks

Trip blanks for VOCs were prepared by the laboratory and accompanied sample containers shipped to the site. The trip blanks remained on-site during sampling, and a trip blank (TB-10/14-1) was included in the cooler containing samples for VOC analysis. The blank was used to determine whether VOCs are introduced into soil samples as a result of on-site conditions or conditions during shipment.

2.3.2.4 Soil Physical and Chemical Properties

A soil sample was collected for physical and chemical properties testing using the procedures identified below. Upon removal from the sampling equipment, excess soil samples were placed in appropriate containers. Samples were screened with a PID prior to sealing the container. After collection of all samples, equal volumes from soil samples were combined to create a sample analyzed for the following:

- ASTM classification of soils (ASTM D 2487)
- Atterberg Limits [ASTM D 4318]
- Cation Exchange Capacity (CEC) [EPA 9081]
- Total Organic Carbon (TOC) [EPA 9060]
- Soil pH [ASTM G51]
- Grain Size and Distribution: Sieve and Hydrometer [ASTM D 422 & D 1140]
- Moisture Content [ASTM D 2216]

2.3.3 Locating Sampling Points

Following the identification of the specific sampling points, chalk was used to mark sampling locations in paved areas and survey flags in unpaved areas before collection of the samples. After completing sampling, Haz-Mat determined the positions of the sampling points in relationship to a permanent structure (distance from two separate points). Horizontal positions of the sampling points were measured to at least the nearest 0.1 foot (actually to the nearest inch). Specific sampling locations are shown on Figure 2-3.

2.3.4 Sample Container Decontamination, Packaging, And Shipping

2.3.4.1 Decontamination of Sample Containers

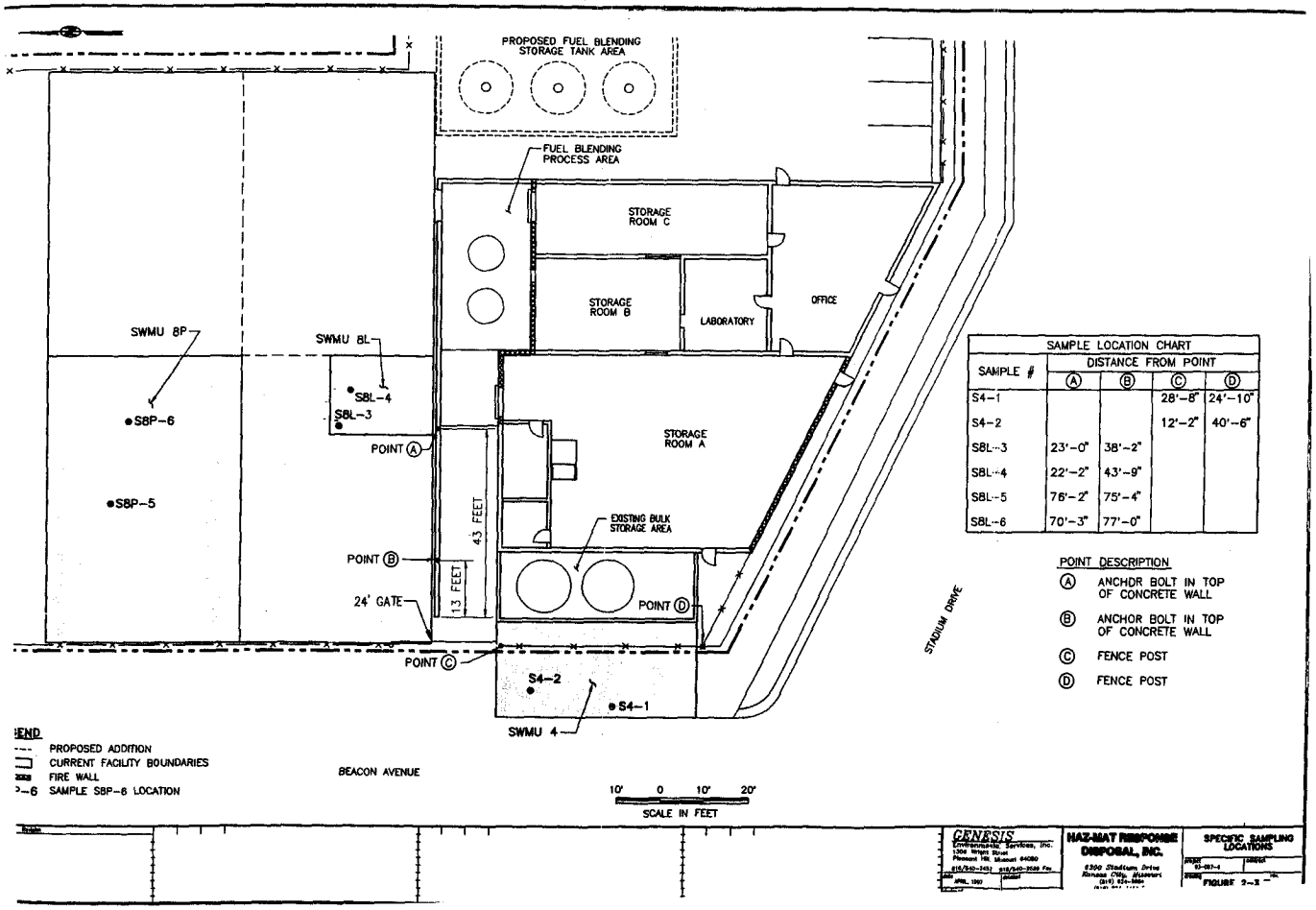
Special precautions are necessary to ensure that samples removed from the Facility are inside the sample container and that no residue remains on the outside of the container. The following procedure were followed:

1. The sample was transferred directly from the clean stainless steel bowl to the sample container by use of a decontaminated stainless steel sampling spoon. The container was filled to the appropriate level.

2. The sample container lids were screwed on firmly without dislodging the lid lining or over tightening the lids. The exterior of the container was wiped clean with a clean paper towel.

3. The sealed sample containers were transported to the packaging area after completion of sampling activities. The sample containers were cleaned of soil or water by again wiping with a clean paper towel.

4. The appropriate adhesive, waterproof sample labels were affixed to the sample container prior to shipment to Haz-Mat. The information written on the label, using a permanent marker, was checked to insure all information was legible.



SAMPLE LOCATION CHART				
SAMPLE #	DISTANCE FROM POINT			
	Ⓐ	Ⓑ	Ⓒ	Ⓓ
S4-1			28'-8"	24'-10"
S4-2			12'-2"	40'-6"
S8L-3	23'-0"	38'-2"		
S8L-4	22'-2"	43'-9"		
S8L-5	76'-2"	75'-4"		
S8L-6	70'-3"	77'-0"		

POINT DESCRIPTION

Ⓐ ANCHDR BOLT IN TOP OF CONCRETE WALL

Ⓑ ANCHOR BOLT IN TOP OF CONCRETE WALL

Ⓒ FENCE POST

Ⓓ FENCE POST

GENESIS Environmental Services, Inc.

HAZ-MAT RESPONSE DISPOSAL, INC.

SPECIFIC SAMPLING LOCATIONS

FIGURE 2-3

2.3.4.2 Sample Packing and Shipping

Sample packaging and shipping procedures are based on EPA specifications as well as U.S. Department of Transportation (DOT) Regulations (49 CFR Parts 172 and 173). Samples were packed and shipped according to requirements for low hazard level samples.

The steps outlined below were followed to pack these low hazard samples:

1. Decontaminated sample containers were arranged in groups by sample number.

2. Containers were arranged in front of the assigned coolers.

3. Each glass sample container was wrapped with protective packing material (bubble wrap pouch).

4. Approximately 2 inches of packing material was placed in the bottom of the cooler for cushioning.

5. The cooler was lined with a large trash bag.

6. Sample containers were placed inside the trash bag in the cooler.

7. Remaining volume of the trash bag was filled with packaging material.

8. The trash bag was sealed with tape.

9. Ice packaged in double sealable plastic bags was added and the remaining volume of the cooler was filled with packing material.

10. The chain-of-custody (COC) record was signed and the time and date the cooler was sealed was indicated. The time was recorded in the field log book.

11. Copies of COC forms were separated. Appropriate copies were sealed in a large sealable plastic bag and taped to the inside lid of the cooler.

12. The cooler drain was taped shut.

13. The lid was closed. The cooler was taped shut on both ends, with several revolutions made with clear packing tape. The custody seal was covered, but was legable through the clear packing tape. Shipping labels were not covered.

14. The air bill with contracted laboratory address was placed on top of the cooler.

15. A custody seal was affixed over the lid openings (front right corner). As mentioned previously the custody seal was covered with clear plastic tape.

16. Haz-Mat will maintain a file of sample shipping records.

2.3.4.3 Time Considerations for Shipping Samples

All samples were packaged and transported the day after collection. Samples were stored overnight in a sealed refrigerator. The holding time requirements for the various analyses requested are specifically outlined in Tables 2-2.

2.3.5 Management Of Investigation-Derived Waste

2.3.5.1 Waste Materials

Field investigation activities resulted in the production of waste materials that needed proper disposal. Management of investigation derived wastes requires compliance with federal and state requirements for generation, storage, transportation and disposal. Several waste types were generated as part of the field activities described in this report. These waste materials are as follows:

- Excess soil samples. These are soil and rock materials generated during intrusive activities. Excess soil was returned to the sampling trench.

- Disposable equipment. This category includes disposable personal protective clothing and any other discardable materials generated during the RFI field investigation (i.e., disposable gloves, paper towels, waste packaging and sampling containers).

- Decontamination (decon) Fluids. Decon fluids include wash waters and other solutions used to decontaminate sampling equipment.

2.3.5.2 Waste Soil and Other Solid Wastes

The procedure for handling excess soil samples was to return the soil to its original sampling trench. Disposable equipment was placed in DOT-approved containers. Each drum was labeled with the type of matrix contained, date collected, and the source of the waste (i.e., RFI sampling – only one partial drum of waste was generated) prior to storing on-site in designated areas. The drummed material will be disposed of as appropriate depending on the material and the chemical testing of soil samples.

2.3.5.3 Wastewater

The wastewater generated was decontamination fluids. All wastewater was placed in a labeled container suitable for storage of the material. A partial drum of wastewater was generated.

2.3.6 Sample Numbering System

A numbering system was used to identify each surface and subsurface soil sample. The purpose of this numbering system is to provide a tracking system for data retrieval. The sample identification allocated for the RFI was used on all sample labels, chain-of-custody records, and all other applicable documentation used during the sampling activity. The Project Manager will maintain a listing of all sample identification numbers in the field logbook.

2.3.6.1 Soil Sample Locations

All samples were identified with a unique sample number. The sampling numbering system was comprised of the sampling point, sample designator, and quality control designator, if appropriate.

The sample identification consisted of the sample point number (e.g., S4-1). "S4" indicates a sample from SWMU 4 and "1" is first sampling location. Since the SWMU 8 was divided into two areas, the parking area and the loading dock, this SWMU's sample designation for the areas was S8P and S8L, respectively. The matrix abbreviation in the sample designator was dropped since all environmental samples were soil samples. The sample number was used to designate a surface or subsurface sample. The sample collected closest to the surface at a given location was sample 01 and the deeper sample was 02. Depth designations were as follows:

01	Surface Soil
02	Subsurface Soil

Since all samples in this phase of the RFI are soil samples, specific matrix designators (i.e., SR, SB, GW) were not required.. Matrix abbreviations will be provided in case contingent actions are required in the future that will result in sampling of multiple matrices. Groundwater and subsurface soil samples (from direct push or borings) were not planned and were not collected during the RFI.

2.3.6.2 Samples

As specified above soil samples were identified according to location. Soil samples were further identified with depth. Samples collected from one location were consecutively numbered by depth. The actual sample depth was recorded in the logbook and on the chain-of-custody record.

Surface soil samples collected from surface locations or beneath paving were not designated with "SR" as a prefix followed by the sampling point number as originally proposed in the Work Plan because it served no significant purpose.

In summary, the sample numbering system consisted of SWMU location, sample point, and depth interval indicator. The following are examples of the sample numbering system:

SWMU	Sample Point	Depth Indicator
S4	1	01
S4	1	02
S8L	4	01
S8P	6	02

Subsurface soil samples were not originally planned for this phase of the RFI; however, EPA/MDNR required sample collection between 4- and 5-feet. These samples had 02 depth indicators incorporated into the sample number.

2.3.6.3 Quality Control Samples

For equipment rinsate blanks and matrix spike and matrix spike duplicates (MS/MSDs), a suffix was added to the associated sample number to identify the type of sample. Duplicate samples consisted of a "blind" sample with a unique sample number. This duplicate sample was identified as to its true designation in the field logbook. Soil MS/MSDs were taken from the original sample. The chain-of-custody identified the samples where MS/MSDs were completed, and the lab split the sample appropriately and assign designations (MS and MSD). Trip blanks would have been numbered sequentially and the date would have been included in the sample number; however, only one trip blank was required. Examples of the sample number designations for quality control samples are as follows:

Type of Sample	Suffix	Example
Equipment Rinsate Blank	R	S8L-3-02R
Trip Blank	TB	TB-10/14-1
Matrix Spike	MS	S8L-3-01MS
Matrix Spike Duplicate	MSD	S8L-3-01MSD

2.3.7 Sample Custody And Documentation

Each sample or field measurement was documented to facilitate timely, correct and complete analysis, and to support actions concerning the Facility. The documentation system provided the means to identify, track, and monitor each individual sample from the point of collection through final reporting of the data. All appropriate forms are included in the Appendix B at the end of this Report. Specific documentation is described in the following sections.

2.3.7.1 Documentation Procedures

A suitable work area was established with sufficient space available for processing forms and packaging samples. After all the sample documentation had been completed and before the samples were prepared for shipping, project team members cross checked the data on forms and labels and compared the data to the logbook entries.

The completion of documents is discussed in sections 2.3.7.2 through 2.3.7.7. The list below is given as a general reference for completion of the sample documentation.

- A list of samples packaged and shipped and the laboratories to be used was made. Specific instructions for packaging and shipping samples are located in section 2.3.4.

- The number of sample containers, sample numbers, laboratory, date sampled, and date shipped was entered in the field logbook.

- The number of shipping containers (coolers) required to accommodate the day's shipment was determined. This was based on the number of samples to be shipped, the number of containers per sample, and the number of laboratories to be used.

- A shipping record (if applicable) was completed for the laboratory address.

- Shipping record numbers are maintained at the facility in the RFI file.

- A chain-of-custody record was assigned to the cooler and the sample containers shipped.

- Chain-of-custody record numbers were assigned to each sample and these numbers will be maintained in the RFI file.

- Each sample was assigned a unique sample number and these numbers were entered in the field logbook and are maintained in the RFI file.

- Sample label numbers were assigned to each sample container for each sample and these numbers were entered in the field logbook.

- Chain-of-custody records were completed based on the information provided in the field logbook.

- A custody seal was assigned to the cooler.

- The paperwork associated with the cooler was grouped.

- The chain-of-custody record was signed prior to shipment.

- Samples were prepared for shipment.

Following are descriptions of field forms. The sample numbering system used is described in section 2.3.6 above.

2.3.7.2 Field Logbook Record

Information pertinent to the RFI sampling activities was recorded in a bound logbook with consecutively numbered pages. All entries in the logbook and on the sample documentation was

made in ink and corrections consisted of line-out deletions that were initialed and dated. The person responsible for the entries signed and dated each page after entering it in the logbook.

No general rules can specify the exact information that must be entered in a logbook for a particular site. However, the logbook contains sufficient information so that the sampling activities can be reconstructed, if necessary. The logbook was kept in the field team's possession or in a secure place during the investigation. Following the investigation, the logbook has become part of the final project file. A listing of typical field logbook entries is as follows:

- Identification number of sample
- Type of sample
- Location of sample
- Depth of sample
- Sample withdrawal procedure/equipment
- Date and time of collection
- Types of sample containers and sample identification numbers
- Parameters requested for analysis
- Field test equipment analysis data and methods
- Sample shipment information - name of carrier, air bill number, and date and time of shipment
- Document control numbers assigned to chain-of-custody records
- Field observations on sampling event
- Name of sample collector(s)
- Sample description (color, odor, etc.)
- Organic vapor detector readings
- Identification of samples to hold for back-up analyses in the future

A crosscheck of information recorded in the field logbook by members involved in the sampling activities was conducted on a regular basis.

2.3.7.3 Chain-of-Custody Record

The chain-of-custody record was employed as physical evidence of sample custody. The sampler completed a chain-of-custody record to accompany the sample shipment from the field to the laboratory.

The custody record was completed using ink. Corrections were made by drawing a line through the error, initialing and dating the error, and then entering the correct information, if required. Erasers were not permissible. A copy of the chain-of-custody record is provided in Appendix B.

After completion of the chain-of-custody record, the original signature (top) copy was enclosed in a plastic bag and secured to the inside of the cooler lid. A copy of the custody record was retained for the FSM.

2.3.7.4 Sample Labels

The sample labels contained specific information regarding the sample and identified each sample collected and transferred to a laboratory for analysis. A typical sample label is depicted in Appendix B. This is not the exact label used since the laboratory pre-affixed labels to jars. Each completed sample identification label was securely fastened to the sample container, therefore, an exact copy could not readily be obtained.

2.3.7.5 Custody Seals

Custody seals were placed on the cooler sent to the laboratory. The cooler was sealed on opposite sides with one side containing a custody seal. A typical custody seal is shown in Appendix B. As long as custody records are sealed inside the sample cooler and custody seals remain intact, commercial carriers are not required to sign the custody form.

The sample custodian at the laboratory who accepts the incoming sample shipments signed and dated the custody record to acknowledge receipt of the samples, completing the sample transfer process. It is then the laboratory's responsibility to maintain internal logbooks that provide a record of sample custody throughout sample preparation and analysis.

2.3.7.6 Laboratory Custody

Laboratory custody conformed to the procedures described in the QAPP.

2.3.7.7 Corrections to Documentation

All original data recorded was written with ink. No accountable, serialized documents were destroyed or thrown away, even if they were illegible or contain inaccuracies that required a replacement document. If an error was made on an accountable document assigned to one individual, the individual made corrections by marking a line through the error and entering the corrected information. The erroneous information was not obliterated. The person who made the entry corrected any subsequent error discovered on an accountable document. All subsequent corrections were initialed and dated.

* * * * *

3.0 ANALYTICAL RESULTS

This discussion of analytical results is divided into two main subsections, data validation and data presentation. The data validation discussion provides a review of exceptions to the Work Plan and a discussion of precision, accuracy, representativeness, completeness, comparability, and sensitivity of the analytical laboratory efforts for this project. The analytical results are presented herein for the RFI according to sampling areas. Therefore analytical results are reported for SMWU 4, the SWMU 8 Parking Lot Area, and the SWMU 8 Loading Dock Areas and are presented in tabular for in Appendix C, D, and E, respectively.

3.1 DATA VALIDATION

3.1.1 Overview

This data quality evaluation has been prepared for soil samples collected on October 14, 1997, at Haz-Mat Response Disposal, Inc., of Kansas City, Missouri (Haz-Mat). The sampling was conducted as part of a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) as detailed in the RCRA Facility Investigation Work Plan (Work Plan), prepared May 1997 (and amended July 1997) by Genesis Environmental & Safety Services, Inc., of Pleasant Hill, Missouri (Genesis). Sampling activities were performed by Haz-Mat personnel and were observed by Genesis.

3.1.1.1. Field Quality Control Samples

Field quality control (QC) samples (e.g., equipment rinsate blanks, field duplicates, etc.) were collected and associated to the samples according to the information presented in Table 3-1. The number of field QC samples met the collection frequency requirements of the "Data Collection Plan" (DCP) in the Work Plan.

3.1.1.2. Analysis Methods

Analytical work was performed by American Environmental Network of Cary, North Carolina (AEN), formerly known as IEA, Inc. (IEA was purchased by AEN). The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and the eight RCRA metals by the SW-846 methodologies specified in Appendix A of the Work Plan.

Table 3-1
Quality Control Sample Associations

QC Sample Type	Sample Name	
	Soil Matrix Field Samples	**Water Matrix Field QC[a]**
Trip Blank	TB-10/14-1	TB-10/14-1
Rinsate Blank	S8L-3-02R	S8L-3-02R
MS/MSD	S8L-3-01	S8L-3-02R[b]
Field Duplicate Pair	S8L-4-0l/S94-4-01	NA[c]

Notes:
a = Refers to rinsate blank and trip blank
b = AEN chose this sample to be the batch MS/MSD sample; not required by Work Plan
c = Not applicable

3.1.1.3. Data Quality Evaluation Review Procedures

Data were reviewed for their precision, accuracy, representativeness, completeness, and comparability (PARCC) as well as sensitivity. The specific QC checks reviewed to assess the PARCC and sensitivity parameters are listed in the "Quality Assurance Project Plan" (QAPP) of the Work Plan. These QC checks were reviewed for method and QAPP compliance. When noncompliances were found or when employed corrective actions were unsuccessful in resolving a problem, the problems were documented according to the guidance presented in the following three documents:

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA-540/R-94-013, 1994*

- *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, EPA-540/R-94-012, 1994*

- *Evaluation of Metals Data for the Contract Laboratory Program (CLP) Based on SOW 3190, SOP Revision XI, USEPA Region 11, 1992*

3.1.2. Exceptions to the Work Plan's Field Sampling & Chain-Of-Custody Procedures

3.1.2.1. Field Sampling Procedures

The field-originated chain-of-custody forms indicated that the shallow depth samples were collected at a typical range of 24 to 36 inches. This corresponded roughly to the 0 to 1 foot below surface cover originally anticipated in the DCP. Further discussion is presented in the main project report. Sample names deviated slightly from the guidelines in the DCP-matrix abbreviations were omitted by field personnel. The omissions do not adversely affect the data quality.

3.1.2.2. Chain-of-Custody

No deviations from Work Plan requirements were noted.

3.1.3. Evaluation Of Data Quality Indicators

3.1.3.1. Precision

Precision is concerned with reproducibility of analyses. Precision can be evaluated by use of spiked duplicates (MS/MSDs) or unspiked duplicates (laboratory duplicates).

Organic Precision Indicators

Matrix Spike/Matrix Spike Duplicates

All VOC MS/MSD relative percent differences (RPDS) were below AEN's QC maximum limits with the exception noted in this section. The 20 percent trichloroethene RPD in water MS/MSD Sample S8L-3-02R exceeded AEN's QC maximum limit of 14 percent. No sample qualification was deemed to be necessary based on the water MS/MSD for the following reasons: the MS/MSD was associated only with field-based blanks (i.e., rinsate, trip); the trichloroethene exhibited acceptable recovery in associated laboratory control sample (LCS) LCSLW; and the USEPA guidance generally does not recommend qualifying associated samples based solely on organic MS/MSDs.

All SVOC MS/MSD RPDs were below AEN's QC maximum limits.

Inorganic Precision Indicators

This review employed the 20 percent water and 35 percent soil RPD criteria recommended by the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.

Matrix Spike/Matrix Spike Duplicates

All MS/MSD RPDs were within the review criteria.

Laboratory Duplicates

All laboratory duplicates RPDs were within the review criteria.

3.1.3.2. Accuracy

Accuracy is concerned with whether sample results were biased due to errors in the sample preparation, errors in sample analysis, or errors attributable to sample matrix. Several different types of recovery studies (e.g., surrogates, MS/MSDs) can examine accuracy. LCS results were

reviewed when MS/MSD results were out of acceptable limits to determine whether the analytical process was in control.

Organic Accuracy Indicators

Surrogates

All VOC and SVOC surrogates were within the AEN's QC ranges.

Internal Standards

All VOC and SVOC sample internal standards achieved peak areas within 50 to 200 percent and retention times of ±30 seconds as compared to the internal standards in their associated continuing calibration standards.

Matrix Spike/Matrix Spike Duplicates

All of the VOC matrix spike (MS) and matrix spike duplicate (MSD) recoveries were within AEN's QC ranges with the exception noted below. The 122 percent trichloroethene MSD recovery in water MS/MSD Sample S8L-3-02R slightly exceeded AEN's 120 percent QC maximum limit. However, it was judged that data qualification was not warranted for the following reasons: the MS/MSD was associated only with field-based blanks (i.e., rinsate, trip), the trichloroethene exhibited acceptable recovery in associated LCS LCSLW (110 percent), the associated field-based blanks were non-detect for trichloroethene, and the USEPA guidance generally does not recommend qualifying associated samples based solely on organic MS/MSDs.

All of the SVOC MS and MSD recoveries were within AEN's QC ranges with the exceptions noted below. The MS 2,4-dinitrotoluene recovery (90 percent) in soil MS/MSD Sample S8L-3-01 slightly exceeded AEN's 89 percent QC maximum criterion. However, it was judged that data qualification was not warranted for the following reasons: 2,4-dinitrotoluene exhibited acceptable recovery in associated LCS LCS037 (72 percent), all but one of the associated samples were non-detect for base neutral analytes (and the one detection was not for this analyte), and USEPA guidance generally does not recommend qualifying associated samples based solely on organic MS/MSDs.

Inorganic Accuracy Indicators

Matrix Spike/Matrix Spike Duplicates

All of the metals MS and MSD recoveries were within AEN's QC ranges with the exceptions noted below.

The 143 percent barium MS recovery in soil MSIMSD Sample S8L-3-01 exceeded the maximum QC limit of 125 percent. The LCS associated with this MS/MSD exhibited acceptable recovery. The soil MS/MSD was associated with all Haz-Mat soil samples. According to USEPA guidance, positive barium detections in the associated samples should be qualified as estimated ("J") to indicate potential bias. Barium was detected in all Haz-Mat soil samples; thus, all soil samples had their barium results qualified as indicated above.

The 63 percent chromium MS recovery in soil MS/MSD Sample S8L-3-01 fell below the minimum QC limit of 75 percent. The LCS associated with this MS/MSD exhibited acceptable recovery. The soil MS/MSD was associated with all Haz-Mat soil samples. According to USEPA guidance, all chromium results (detect and non-detect) in the associated samples were qualified as estimated ("J") to indicate potential bias.

The spike amounts used for arsenic and lead were less than 25 percent of the concentrations of these metals already present in soil Sample S8L-3-01. As such, no conclusion can be drawn about the accuracy of the arsenic and lead analyses on soil samples based on MS/MSD results. The arsenic and lead recoveries in the associated LCS indicated that the method was in control.

Miscellaneous Indicators

AEN noted that some arsenic and selenium concentrations were determined by the method of standard additions.

3.1.3.3. Representativeness

Representativeness is concerned with how sample analytical data truly reflect actual site conditions. Representativeness can be examined with the following: blanks (to determine whether samples became contaminated from another laboratory or field source), holding times and sample

preservation (to determine whether sample results are potentially biased due to sample degradation over time), and field duplicates (to examine whether the sample matrix is heterogeneous and/or whether there was variability in sampling technique). Since neither SW-846 nor the national USEPA guidance documents provide guidance on evaluating field duplicate results, this review adopted an approach similar to that in the *USEPA Region 11 Evaluation of Metals Data for the Contract Laboratory Program (CLP) Based on SOW 3190, SOP Revision XI.* When detections in both portions of the duplicate were five or more times the sample quantitation limit, then the acceptance criterion was 100 percent maximum RPD. For smaller detections, the acceptance criterion was variability less than two times the sample quantitation limit.

Blanks

Method Blanks

No detections were reported for the VOC, SVOC, and metals method blanks.

Equipment Rinsate Blanks

No detections were reported for the VOC, SVOC, and metals in rinsate Blank S8L-3-02R.

Trip Blanks

No VOC detections were found in trip Blank TB-10/14-1.

Holding Times and Sample Preservation

Holding Times

All VOC analysis-holding times were met. All SVOC extraction and analysis holding times were met. All metals analysis-holding times were met.

Cooler Temperature

AEN reported that the cooler temperature was an acceptable 4°C upon receipt by the laboratory.

Sample pH

Metals equipment rinsate Blank S8L-3-02R was reported as having sample pH>2 at time of sample preparation. The reasons for the higher pH are not clear. Since the affected sample was field QC

sample and not a field sample, this data quality evaluation chose to not qualify equipment rinsate blank metals results based on sample pH.

Field Duplicates

All VOCs were non-detect in the field duplicate pair S8L-4-01/S94-4-01. The reporting limits were comparable between the original and duplicate portions.

All SVOCs were non-detect in the field duplicate pair. The reporting limits were comparable between the original and duplicate portions.

Non-detections of cadmium, mercury, and silver were reproduced at comparable reporting limits in the metals field duplicate. Detections of arsenic, barium, chromium, lead, and selenium were reproduced within the QC criteria established by USEPA Region 11. Table 3-2 presents the metals results for the field duplicate pair.

3.1.3.4. Completeness

Sampling Completeness

Sampling completeness was 100 percent.

Analytical Completeness

All samples sent to AEN were analyzed. However, certain VOC and SVOC analytes were not reported, as indicated later in this section. Thus, analytical completeness was 95 percent for VOCs, 98 percent for SVOCs, and 100 percent for metals. Percentages were calculated based on a comparison of the number of analytes listed in Appendix A of the Work Plan that were actually analyzed and reported vs. the number of analytes that were in Appendix A for a given analysis type.

The original data reports issued by AEN were missing 40 percent of the VOC analytes and 2 percent of the SVOC analytes. AEN had calibrated for the missing analytes; however, a miscommunication resulted in an abbreviated analyte list being reported. The missing VOC information was subsequently reported; new reports were not issued to report missing SVOC

Table 3-2
Field Duplicate Results

Analyte	Original Sample S8L-4-01	Duplicate Sample S94-4-01	RPD/Status
Arsenic, mg/kg	5.7	4.6	21 % - ok
Barium, mg/kg	195	172	13% - ok
Cadmium, mg/kg	0.10 U	0.10 U	NA - ok
Chromium, mg/kg	11.9	13.1	10% - ok
Lead, mg/kg	9.9	7.7	25% - ok
Mercury, mg/kg	0.04 U	0.03 U	NA - ok
Selenium, mg/kg	0.8	0.55	37% - ok
Silver, mg/kg	0.10 U	0.10 U	NA - ok

Notes:
NA=RPD not suitable for evaluating agreement

analyte benzoic acid. The analytical completeness percentages were calculated after the additional information was received.

AEN reported total xylenes instead of the individual isomers indicated in Work Plan Appendix A. The difference in xylene reporting was responsible for the slightly lower completeness value for VOCs as compared to the other analysis types.

Data Usability Completeness

Data for VOC, SVOC, and metals analyses were 100 percent usable. All soil barium and chromium detections were qualified as estimated ("J") and no reliable MS/MSD accuracy data were available for arsenic and lead. However, the soil metals results were determined to be usable based on acceptable results in QC checks such as the LCS and the field duplicate. The usability calculation did not take into account the analytes with reporting limits consistently greater than the Work Plan's goals.

3.1.3.5. Comparability

The usable analytical data from this investigation are comparable with data obtained by the same analytical methods referenced in Appendix A of the Work Plan.

3.1.3.6. Sensitivity

Most of the VOC reporting limits in the soil matrix samples were slightly greater than the reporting limits in Work Plan Appendix A due to sample moisture correction factors. However, three analytes universally had reporting limits roughly a factor of two higher than the Work Plan's goals: bromomethane, chloromethane, and methylene chloride.

SVOC reporting limits were at or below the reporting limits indicated in the Work Plan with one exception; 2,4-dinitrophenol universally had a reporting limit greater than the Work Plan's goal.

Non-detect metals had reporting limits at or below the reporting limits indicated in Work Plan Appendix A.

3.1.4. Data Validation Conclusions

The analytical data are valid for use (as qualified) in reporting the results of this RFI.

3.2 DISCUSSION OF RESULTS

As stated above, based on data validation review, the data presented is useable as qualified. All VOC results are presented in Appendix E by analyte and sample number. All SVOC data are presented in Appendix F by analyte and sample number. All metals data are presented in Appendix G by analyte and sample number. The results are identified with the results of the validation review. Analytical results may include the following data qualifier:

U – Undetected at the detection limit provided

J – Estimated value

B – Indicates the compound was detected in an associated blank sample

R – Rejected data (none rejected in this report)

Where there were detectable VOC or SVOC results, they have been printed with a bold font in the data tables. Metals results that exceeded the "typical" Missouri soil levels (presented below), have been printed with a bold font in the data tables. Other ambient metals levels are presented in Table 3-3.

"Typical" Missouri Soil Levels of RCRA Metals
(All values are presented in mg/kg)

Metal	Concentration
As	19
Ba	580
Cd	1.3
Cr	69
Pb	24
Hg	0.057
Se	0.39
Ag	<0.5

3.2.1 SWMU 4 Results

SWMU 4, the Former Bulk Tank Storage Area, revealed low levels of three SVOCs in the *RFA*. No SVOCs were detected in RFI samples from SWMU 4. The SVOCs found during the *RFA* were

Table 3-3

LEVELS OF RCRA HEAVY METALS IN SOIL

(All Levels in mg/kg)

Metal	Atomic Symbol	Missouri Levels**	USA Average**	USA Range**	Missouri Level***	Typical Range****
Arsenic	As	19	7.2	<0.1 to 97	8.7	1 to 40
Barium	Ba	170	5.8	10 to 5,000	580	100 to 3,500
Cadmium	Cd	1.3	0.06	0.01 to 7	<1.0	0.01 to 7.0
Chromium	Cr	69	54	1 to 2,000	54	5 to 3,000
Lead	Pb	24	19	<10 to 700	20	2 to 200
Mercury	Hg	0.057	0.089	<0.01 to 4.6	0.039	0.01 to 0.08
Selenium	Se	0.39	0.39	<0.1 to 4.3	0.28	0.1 to 2.0
Silver	Ag	<0.5	ND*	ND*	ND*	0.1 to 5.0

* ND = no data available

** Laura Coffman, Chatman & Associates, Inc. (U.S. Geological Survey Technical Paper)

*** Geochemical Survey of Missouri, Geography, 1984

**** Dragun, James; Hazardous Materials Control Research Institute; *Soil Chemistry of Hazardous Materials*, 1988

polycyclic aromatic hydrocarbons (PAHs), typically associated with products of incomplete combustion. No PAHs were found in the samples collected at SWMU 4. It should be noted that in collecting samples at SWMU 4, a layer of cinders was observed in the fill material in this area. Also pieces of coal were found in the fill material at the Site. The cinder layer was found at all sampling locations while traversing fill material to obtain native soil samples. Use of these types of materials could explain the presence of the SVOCs during the RFA if samples were collected within the fill zone. Once again, no SVOCs were detected in SWMU 4 samples.

The only detectable organic compounds found in SWMU 4 samples were acetone and 2-butanone (also known as methyl ethyl ketone, MEK, and methyl acetone), which are VOCs. The acetone and MEK were detected at concentrations of 90 µg/kg (detection level of 12 µg/kg) and 16 µg/kg (detection level of 12 µg/kg), respectively. It should be noted that SWMU 4 is located outside the security fence for the Facility. The acetone and MEK were detected in sample S4-1-01; which was a shallow (24" to 27" bgs) sample. No acetone or MEK were detected in S4-1-02; which is the corresponding deep (48" to 51" bgs) sample. There were no detectable VOCs or SVOCs in S4-2-01 or S4-2-02 (the second SWMU 4 sampling location). The specific rationale for the presence of acetone and MEK in this isolated instance cannot be positively determined. Acetone is a common laboratory solvent. Acetone was also used in the decontamination of sampling equipment. It is also possible that MEK (i.e., methyl acetone) could be a contaminant present in the acetone rinse solution. These VOCs were present at very low levels and in one isolated sample.

Review of metals data for SWMU 4 revealed levels of selenium and lead that were slightly above typical Missouri levels; however, none of the metal levels were above the Typical Range that can be found at naturally occurring levels in soil.

3.2.2 SWMU 8 – Parking Lot Area

During the *RFA* an SVOC was detected in this area. This was bis(2-ethylhexyl)phthalate (DEHP). DEHP is one of the more common phthalate plasticizers. It is used in PVC and other plastics. DEHP can be released from plastic goods to the environment. It is not persistent in the environment under aerobic conditions (i.e., has a half-life of several hours in the atmosphere and several weeks in surface waters). No DEHP, nor any other SVOC, was detected in the samples

collected from the SWMU 8 Parking Lot Area during the RFI.

During the *RFA* acetone was also detected in this area. No VOCs were detected in samples collected from the SWMU 8 – Parking Lot Area during the RFI.

Review of metals data for the SWMU 8 – Parking Lot Area revealed levels of arsenic, lead, and selenium that were slightly above typical Missouri levels; however, none of the metal levels were above the Typical Range that can be found at naturally occurring levels in soil.

3.2.3 SWMU 8 – Loading Dock Area

During the *RFA*, the sample collected (and a duplicate) at the SWMU 8 Loading Dock Area contained part per billion levels of 1,1,1-trichloroethane (TCA), 1,1,2,2-tetrachloroethene, and toluene. The Draft RFA Report stated that these "...volatiles were in the low ppb range, indicating past releases but probably not of a significant nature." No VOCs were detected in samples collected in this area during the RFI.

A low concentration of bis(2-ethylhexyl)phthalate (DEHP) was detected in one of the samples collected from this area during the RFI. In sample S8L-3-02, a deep (48" to 51" bgs) soil sample, 490 µg/kg (detection level of 410 µg/kg) DEHP was detected. This is the same compound detected in the Parking Lot Area during the *RFA*. No DEHP was detected in the shallow sample from the same sampling location during this sampling event (i.e., the RFI). DEHP was not detected in any other sample collected during the RFI.

Review of metals data for the SWMU 8 – Loading Dock Area revealed levels of lead and selenium that were slightly above typical Missouri levels; however, none of the metal levels were above the Typical Range that can be found at naturally occurring levels in soil.

* * * * *

4.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions are provided herein by sampling areas. In summary, there was no significant environmental contamination found during the RFI. Only two samples of the twelve environmental samples collected had any detectable organic compounds. These results could be questioned as discussed below. There were detectable levels of some of the RCRA metals at all sampling locations; however, there were no levels present above normal background levels. Metals were detected within the range of concentrations for naturally occurring soils.

4.1 CONCLUSIONS

4.1.1. SWMU 4

Sampling results associated with the SWMU 4, the former Bulk Tank Storage Area, did not reveal environmental contaminates of significance. The sampling effort at this location consisted of the collection of samples at two locations. Two samples were collected at each location (S4-1 and S4-2), one sample at 24- to 27-inches bgs and one sample at 48- to 51-inches bgs for *each* location. Data are presented in Appendix C, D, and E for VOCs, SVOCs, and metals, respectively.

VOCs were detected only in sample S4-1-01. Acetone and 2-butanone (also known as methyl ethyl ketone, MEK, and methyl acetone), were detected at concentrations of 90 µg/kg (detection level of 62 µg/kg) and 16 µg/kg (detection level of 12 µg/kg), respectively. No acetone or MEK was detected in S4-1-02; which is the corresponding deep (48" to 51" bgs) sample. The specific rationale for the presence of acetone and MEK in this isolated instance cannot be positively determined. Acetone is a common laboratory solvent. Acetone was also used in the decontamination of sampling equipment. It is also possible that MEK (i.e., methyl acetone) could be a contaminant present in the acetone rinse solution. These VOCs were present at very low levels and in one isolated sample only.

No SVOCs were detected at location. There were detectable levels of some RCRA metals; however, there were no extraordinarily high levels. While some metal levels were above a

"typical" Missouri soil level, all concentrations were within the range of naturally occurring soil levels, see Table 3-3 in the previous section of this report.

4.1.2. SWMU 8 – Parking Lot Area

No SVOCs or VOCs were detected in the samples collected from the SWMU 8 Parking Lot Area during the RFI. Review of metals data for the SWMU 8 – Parking Lot Area revealed levels of arsenic, lead, and selenium that were slightly above typical Missouri levels; however, none of the metal levels were above the Typical Range that can be found at naturally occurring levels in soil.

4.1.3 SWMU 8 – Loading Dock Area

A low concentration of bis(2-ethylhexyl)phthalate (DEHP) was detected in one of the samples collected from this area during the RFI. In sample S8L-3-02, a deep (48" to 51" bgs) soil sample, 490 µg/kg (detection level of 410 µg/kg) DEHP was detected. This is the same compound detected in the Parking Lot Area during the *RFA*. No DEHP was detected in the shallow sample from the same sampling location during this sampling event (i.e., the RFI). DEHP was not detected in any other sample collected during the RFI. This detection may be an anomaly since DEHP was not detected in the shallow sample.

No VOCs were detected in the soil samples collected at the SWMU. Review of metals data for the SWMU 8 – Loading Dock Area revealed levels of lead and selenium that were slightly above typical Missouri levels; however, none of the metal levels were above the Typical Range that can be found at naturally occurring levels in soil.

4.2 RECOMMENDATIONS

There is no significant evidence that soils or subsurface soils have been adversely impacted by past activities at the facility. Based on these data and historic data, no further action is recommended for the facility.

* * * * *

APPENDIX A
Analytical Methods

APPENDIX A
ANALYTICAL METHODS AND LIST OF ANALYTES

VOCs

Method SW-846 8260A

Parameter	Anticipated Reporting Limit µg/L	µg/Kg	Parameter	Anticipated Reporting Limit µg/L	µg/Kg
Acetone	100	100	1,2-Dichloropropane	5	5
Acrylonitrile	5	5	1,3-Dichloropropane	5	5
Benzene	5	5	2,2-Dichloropropane	5	5
Bromobenzene	5	5	1,1-Dichloropropene	5	5
Bromochloromethane	5	5	cis-1,3-Dichloroprope	5	5
Bromodichloromethane	5	5	trans-1,3-Dichloropro	5	5
Bromoform	5	5	Ethylbenzene	5	5
Bromomethane	5	5	2-Hexanone	50	50
2-Butanone	100	100	Iodomethane	5	5
Carbon Disulfide	5	5	Methylene Chloride	5	5
Carbon Tetrachloride	5	5	4-Methyl-2-pentanone	100	100
Chlorobenzene	5	5	Styrene	5	5
Chlorodibromomethane	5	5	1,1,1,2-Tetrachloroeth	5	5
Chloroethane	5	5	1,1,2,2-Tetrachloroeth	5	5
Chloroform	5	5	Tetrachloroethene	5	5
Chloromethane	5	5	Toluene	5	5
2-Chlorotoluene	5	5	1,2,3-Trichlorobenzen	5	5
4-Chlorotoluene	5	5	1,2,4-Trichlorobenzen	5	5
1,2-Dibromo-3-chloropr	25	25	1,1,1-Trichloroethane	5	5
1,2-Dibromoethane	5	5	1,1,2-Trichloroethane	5	5
Dibromomethane	5	5	Trichloroethene	5	5
1,2-Dichlorobenzene	5	5	Trichlorofluorometha	5	5
1,3-Dichlorobenzene	5	5	1,2,3-Trichloropropan	5	5
1,4-Dichlorobenzene	5	5	1,2,4-Trimethylbenze	5	5
trans-1,4-Dichloro-2-but	100	100	1,3,5-Trimethylbenze	5	5
1,1-Dichloroethane	5	5	Vinyl Acetate	50	50
1,2-Dichlorethane	5	5	Vinyl Chloride	5	5
1,1-Dichloroethene	5	5	o-Xylene *(totals)*	5	5
cis-1,2-Dichloroethene	5	5	m-Xylene	5	5
trans-1,2-Dichloroethene	5	5	p-Xylene	5	5

APPENDIX A (continued)
ANALYTICAL METHODS AND LIST OF ANALYTES

SVOCs

Method SW-846 8270B

Parameter	Anticipated Reporting Limit µg/L	µg/Kg	Parameter	Anticipated Reporting Limit µg/L	µg/Kg
1,2-Dichlorobenzene	10	660	Benzo(k)Fluoranthene	10	660
1,2,4-Trichlorobenzene	10	660	Bis(2-chloroethoxy)m	10	660
1,3-Dichlorobenzene	10	660	Bis(2-Chloroethyl)eth	10	660
1,4-Dichlorobenzene	10	660	Bis(2-Chloroisopropyl	10	660
2-Chlorophenol	10	660	Bis(2-Ethylhexyl)phth	10	660
2-Methylnaphthalene	10	660	Butyl benzyl phthalate	10	660
2-Methylphenol (o-Cres	10	660	Chrysene	10	660
2-Nitrophenol	10	660	Dibenzofuran	10	660
2,4-Dichlorophenol	10	660	Dibenz(a,h)Anthracen	10	660
2,4-Dimethylphenol	10	660	Diethylphthalate	10	660
2,4-Dinitrophenol	10	660	Dimethyl Phthalate	10	660
2,4-Dinitrotoluene	50	3300	Di-n-butyl phthalate	10	660
2,4,5-Trichlorophenol	10	660	Di-n-octyl phthalate	10	660
2,4,6-Trichlorophenol	10	660	Fluoranthene	10	660
2,6-Dinitrotoluene	10	660	Fluorene	10	660
4-Bromophenyl-Phenyle	10	660	Hexachlorobenzene	10	660
4-Chloro-3-Methylpheno	20	1320	Hexachlorobutadiene	10	660
4-Chlorophenyl-Phenyle	10	660	Hexachloroethane	10	660
4-Methylphenol (p-Cres	10	660	Hexachorocyclopenta	10	660
4-Nitrophenol	50	3300	Indeno(1,2,3-cd)pyren	10	660
4,6-Dinitro-2-Methylphe	50	3300	Isophorone	10	660
Acenaphthene	10	660	Naphthalene	10	660
Acenaphthylene	10	660	Nitrobenzene	10	660
Anthracene	10	660	N-Nitroso-Di-N-propy	10	660
Benzoic Acid	50	3300	N-Nitrosodiphenylami	10	660
Benzo(a)Anthracene	10	660	Pentachlorophenol	50	3300
Benzo(a)Pyrene	10	660	Phenanthrene	10	660
Benzo(b)Fluoranthene	10	660	Phenol	10	660
Benzo(g,h,i)Perylene	10	660	Pyrene	10	660

APPENDIX A (continued)
ANALYTICAL METHODS AND LIST OF ANALYTES

RCRA METALS

Parameter	Method	Anticipated Reporting Limit mg/L	Anticipated Reporting Limit mg/Kg
Arsenic	SW-846 7060A	5.0	0.50
Barium	SW-846 6010A	0.02	2.0
Cadmium	SW-846 6010A	0.02	2.0
Chromium	SW-846 6010A	0.02	2.0
Lead	SW-846 7421	2.0	0.2
Mercury	SW-846 7470A/7471A	0.2	0.10
Selenium	SW-846 7740	5.0	0.50
Silver	SW-846 6010A	0.01	1.0

APPENDIX B

Field Data Forms

AEN
American Environmental Network, Inc.
3000 WESTON PKWY.
CARY, NC 27513
PH# 919-677-0090
FAX# 919-677-8702

CHAIN OF CUSTODY RECORD

NO. 90270

REGULATORY CLASSIFICATION - PLEASE SPECIFY

☐ NPDES ☐ DRINKING WATER ☒ RCRA ☐ OTHER _____

☐ STATE CERT. SPECIFY _____ RFI

COMPANY/LOCATION: Haz-Mat Response Disposal 6300 Sladium, Kansas City MO

PROJECT #	PROJECT NAME
RFI-1	Haz-Mat RFI

SAMPLERS: (PLEASE PRINT) E. Busch — SIGNATURE: [signature]

SAMPLE I.D. (20 CHARACTER MAXIMUM)		DATE	TIME	COMP	GRAB	# OF CONTAINERS	MATRIX: SOIL	WATER	OTHER	REQUESTED PARAMETERS: VOC	SVOC Metals
S8P-6-01	24"-27"	10/14	1205		X	2	X			X	X
S8P-6-02	48"-51"	10/14	1210		X	2	X			X	X
S8P-5-01	24"-27"	10/14	1245		X	2	X			X	X
S8P-5-02	48"-51"	10/14	1250		X	2	X			X	X
S4-1-01	24"-27"	10/14	1405		X	2	X			X	X
S4-1-02	48"-51"	10/14	1410		X	2	X			X	X
S4-B2-01	24"-27"	10/14	1430		X	2	X			X	X
S4-B2-02	48"-51"	10/14	1435		X	2	X			X	X
S8L-4-01	32"-36"	10/14	1510		X	2	X			X	X
S8L-4-02	54"-57"	10/14	1515		X	2	X			X	X

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
[signature] E. Busch	10/15	1000			
RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY	DATE	TIME

AEN QUOTE NO.	AEN PROJECT NO.
PROJECT MANAGER (PLEASE PRINT)	P.O. NO.

REMARKS ON SAMPLE RECEIPT

☐ BOTTLE INTACT ☐ CUSTODY SEALS
☐ PRESERVED ☐ SEALS INTACT
☐ CHILLED ☐ SEE REMARKS

AEN REMARKS
RECEIPT TEMPERATURE=

FIELD REMARKS / COMMENTS

IEA
An Aquarion Company
3000 WESTON PKWY.
CARY, N.C. 27513
PH # 919-677-0090
FAX # 919-677-0427

CHAIN OF CUSTODY RECORD

NO. 70129

REGULATORY CLASSIFICATION - PLEASE SPECIFY

☐ NPDES ☐ DRINKING WATER ☒ RCRA ☐ OTHER ______

☐ STATE CERT. SPECIFY RFI

CLIENT/COMPANY/LOCATION
Haz-Mat Response Disposal
6300 Stadium, Kansas City, MO

PROJECT NO.	PROJECT NAME
RFI - 1	Haz-Mat RFI

SAMPLERS: (PLEASE PRINT)	SIGNATURE
S Busch	[signature]

SAMPLE ID	DATE	TIME	COMP	GRAB	# OF CONTAINERS	SOIL	WATER	OTHER	VOC	SVOC Metals										
S94-4-01 32"-36"	10/14	1610		X	2	X			X	X										
S8L-3-01 24-27"	10/14	1605		X	2	X			X	X										
S8L-3-02 48-51	10/14	1610		X	2	X			X	X										
S8L-3-01 MS/MSD	10/14	1605		X	2	X			X	X										
S8L-302 R	10/14	1630		X	3		X		X											
S8L-3-02 R	10/14	1630		X	4		X			X										
TB-10/14 -1	10/14	0800		X	3		X		X											

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED BY	DATE	TIME
[signature]	10/15	1000			

RELINQUISHED BY (SIGNATURE)	DATE	TIME	RECEIVED FOR LAB BY	DATE	TIME

IEA QUOTE NO.	IEA PROJECT NO.

PROJECT MANAGER (PLEASE PRINT)	P.O. NO.

REMARKS ON SAMPLE RECEIPT

☐ BOTTLE INTACT ☐ CUSTODY SEALS
☐ PRESERVED ☐ SEALS INTACT
☐ CHILLED ☐ SEE REMARKS

IEA REMARKS

RECEIPT TEMPERATURE=

FIELD REMARKS / COMMENTS

FIELD SAFETY CHECKLIST

Work Location HAZ MAT RESPONSE DISPOSAL INC. 6300 STADIUM DRIVE KANSAS CITY, MO 64129 Date 14 OCT 97

1. Reviewed work plans with client representative: STEVE BUSCH / JIM CREIGHTON

2. Requested maps of aboveground and underground utilities: N/A

3. Reviewed utility maps: N/A
(water supply, firewater, sewer, process sewer, electric, gas, telephone, other underground piping)

4. Met with utility representative to review utility locations and asked each utility the following questions:
   a. Any underground utilities at the work site?
   b. Any ongoing construction that would affect field activities?
   c. Any vapor releases associated with unit operations?
   d. Any other hazards associated with unit operations?
   e. Any special requirements?

   Name of representative and name of utility:

   DIG RIGHT CONTACTED, RESPONDED AND MARKED. NO SEWER LINES NOT MARKED. VERBAL LOCATION OBTAINED FROM LIANE AT POLLUTION CONTROL DIVISION

5. Permits required: NONE
   Type:

6. Obtained necessary permits: N/A
   Permit expiration date:

7. Request MSDS for any on-site chemicals: N/A

8. Client's established monitoring protocol, if any: SEE BASIC HEALTH AND SAFETY PLAN

9. Obtained final approval for commencement of work: FINAL APPROVAL TO BEGIN WORK GIVEN BY JIM CREIGHTON

AGREEMENT AND ACKNOWLEDGMENT STATEMENT

Site Safety Plan Agreement

HAZMAT Response Disposal's (HAZMAT) Project Manager or Site Health and Safety Supervisor have the authority to stop any work performed by HAZMAT employees or subcontractors if it is not performed in accordance with the requirements of this SHSP.

All HAZMAT project personnel and subcontractor personnel are required to sign the following agreement prior to performing work at the site.

1. I have read and fully understand the SHSP and my individual responsibilities.

2. I agree to abide by the provisions of the SHSP.

Stephen Busch	
Name	Signature
Genesis Env. Svc.	10/14/97
Company	Date
Jim CREIGHTON	
Name	Signature
HAZ-MAT	10/14/97
Company	Date
Paul Shields	
Name	Signature
Haz-Mat	10/14/97
Company	Date
Matt Langston	
Name	Signature
Haz-mat	10-14-97
Company	Date
TONY BURSON	
Name	Signature
HAZ-MAT	10-14-97
Company	Date

(ORIGINAL SIGNATURES IN BASE DOCUMENT)

FIELD CALIBRATION RECORD

Equipment Item:	Mfr. Serial :	Project Acty:
PID PHOTOVAC MP100	HAZMAT Equipment No: N/A	Project No: N/A

	Pre-Calibration Standard			Post-Calibration Standard		
Date	Calibration Standard	Reading	Intl.	Calibration Standard	Reading	Intl.
14 OCT 97	BASIC CALIBRATION GAS	100	JS			
	CALIBRATION					
	MIXTURE, LOT 49567					
	100 PPM ISOBUTYLENE					
	AND AIR					

HEALTH AND SAFETY PLAN FIELD AMENDMENT FORM

Project Name: _____

Project Number: _____

Location: _____

Changes in field activities or hazards:

NONE REQUIRED

Proposed Amendment:

Proposed By: _____ _____
Site Health and Safcty Supervisor (or other) Date

Approved By: _____ _____
Project Manager Date

_____ _____
Health and Safety Manager Date

Declined By: _____ _____
Health and Safety Department Manager Date

Amendment Number: _____

Amendment Effective Date: _____

DAILY AIR MONITORING RECORD

Engr., Tech.
Geol. Jim CREIGHTON Date: OCT 14, 97 Boring/ Well: RFI Level of PPE D

Time	Equipment (Type)	Area Monitored	Concentration PPM/LEL/O_2	Weather and Site Conditions	Integrated sample results			
					Badge #	Start Time	Badge #	Start Time
14/1205	PID/OVM	SBP-06 (ABC)	0 PPM	CLEAR 55°				
14/1245	PID/OVM	SBP-05(ABC)	0 PPM	CLEAR 55°				
14/1405	PID/OVM	S4 -01(ABC)	0 PPM	CLEAR 55°				
14/1430	PID/OVM	S4 - 2(ABC)	0 PPM	CLEAR 55°				
14/1510	PID/OVM	SBL-4 (ABC)	0 PPM	CLEAR 55°				
14/1605	PID/OVM	SBL - 3(ABC)	0 PPM	CLEAR 55°				

LEGEND

Equipment:

OVA - Organic Vapor Analyzer
OVM - Organic Vapor Monitor
LEL/O_2

Area Monitored:

A - Ambient Atmosphere
B - Bore Hole
C - Cuttings

Duration of Reading

(S) - Spike (,10 sec.)
(C) - Continuous

UPS Next Day Air®
UPS Worldwide Express
Shipping Document

See instructions on back. Call 1-800-PICK-UPS (800-742-5877) for additional information.

TRACKING NUMBER N148 0803 48 6

1 SHIPMENT FROM

SHIPPER'S UPS ACCOUNT NO. 923W23

UPS SHIPPER NO. / UPS BILLING NO.

FOR UPS USE

REFERENCE NUMBER

NAME Jim CREIGHTON — TELEPHONE 816-92A-1439

PLEASE MAKE 3 HARD COPIES OF INV

COMPANY HAZMAT RESP. DISP. INC

STREET ADDRESS 6300 STADIUM DRIVE

CITY AND STATE KANSAS CITY, MO — ZIP CODE 64129

2 EXTREMELY URGENT DELIVERY TO

NAME (AEN) — TELEPHONE 919 677 0090

COMPANY AMERICAN ENVIRONMENTAL NETWORK INC.

STREET ADDRESS 3000 WESTON PARKWAY

DEPT./FLOOR

CITY AND STATE (INCLUDE COUNTRY IF INTERNATIONAL) CARY NC — ZIP CODE 27513

3 WEIGHT AND ZONE

WEIGHT (ENTER "LTR" IF LETTER)	DIMENSIONAL WEIGHT (If Applicable)	ZONE
1.51		22

SHIPPER'S COPY

4 TYPE OF SERVICE

	CHARGES
[XX] NEXT DAY AIR / [ ] WORLDWIDE EXPRESS (INTERNATIONAL)	$
FOR WORLDWIDE EXPRESS SHIPMENTS Mark an "X" in this box if shipment only contains documents of no commercial value. [ ] DOCUMENTS ONLY	

5 OPTIONAL SERVICES

[ ] SATURDAY PICKUP See Instructions. / [ ] SATURDAY DELIVERY See Instructions.	$
[ ] DECLARED VALUE Contents are automatically protected up to $100. For declared value over $100, see Instructions. $ _____ AMOUNT	$
[ ] C.O.D. If C.O.D., enter amount to be collected and attach completed UPS C.O.D. tag to package. $ _____ AMOUNT	$
6 ADDITIONAL HANDLING CHARGE [ ] An Additional Handling Charge applies for certain items. See Instructions.	$
TOTAL CHARGES	$

7 METHOD OF PAYMENT

BILL SHIPPER	BILL RECEIVER (Next Day Air Only)	BILL THIRD PARTY (Next Day Air Only)	AMERICAN EXPRESS	MASTER CARD	VISA	CHECK	UPS USE (CASH)
[✓]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]

Record Account No. in Section 8

8 RECEIVER'S / THIRD PARTY'S UPS ACCT. NO. OR MAJOR CREDIT CARD NO. — EXPIRATION DATE

THIRD PARTY'S COMPANY NAME

STREET ADDRESS

CITY AND STATE — ZIP CODE

9 SHIPPER'S SIGNATURE X — DATE OF SHIPMENT 10/15/97

APPENDIX C
VOC Data

Appendix C
Table 1

HAZ-MAT RFI
VOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S4-1-01	Sample No. S4-1-02	Sample No. S4-2-01	Sample No. S4-2-02	Sample No. S8L-3-01	Sample No. S8L-3-02	Sample No. S8L-4-01	Sample No. S9L-4-01	Sample No. S8L-4-02
Acetone	90	62U	61U	62U	60U	62U	62U	61U	65U
Acrylonitrile	6U	6U	6U	6U	6U	6U	6U	6U	6U
Allyl Chloride	6U	6U	6U	6U	6U	6U	6U	6U	6U
Benzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Bromobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Bromochloromethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Bromodichloromethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Bromoform	6U	6U	6U	6U	6U	6U	6U	6U	6U
Bromomethane	12U	12U	12U	12U	12U	12U	12U	12U	13U
2-Butanone	16	12U	12U	12U	12U	12U	12U	12U	13U
N-Butylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Sec-Butylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Tert-Butylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Carbon Disulfide	6U	6U	6U	6U	6U	6U	6U	6U	6U
Carbon Tetrachloride	6U	6U	6U	6U	6U	6U	6U	6U	6U
Chlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Chlorodibromomethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Chloroethane	12U	12U	12U	12U	12U	12U	12U	12U	13U
2-Chloroethyl Vinyl Ether	12U	12U	12U	12U	12U	12U	12U	12U	13U
Chloroform	6U	6U	6U	6U	6U	6U	6U	6U	6U
Chloromethane	12U	12U	12U	12U	12U	12U	12U	12U	13U
2-Chlorotoluene	6U	6U	6U	6U	6U	6U	6U	6U	6U
4-Chlorotoluene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2-Dibromo-3-chloropropane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2-Dibromoethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Dibromomethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2-Dichlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,3-Dichlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,4-Dichlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Dichlorodifluoromethane	12U	12U	12U	12U	12U	12U	12U	12U	13U
1,1-Dichloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2-Dichlorethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1-Dichloroethene	6U	6U	6U	6U	6U	6U	6U	6U	6U
cis-1,2-Dichloroethene	6U	6U	6U	6U	6U	6U	6U	6U	6U
trans-1,2-Dichloroethene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2-Dichloropropane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,3-Dichloropropane	6U	6U	6U	6U	6U	6U	6U	6U	6U

Table 1 (continued)

SWMU 1

SUBSURFACE SOIL SAMPLES - VOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S4-1-01	Sample No. S4-1-02	Sample No. S4-2-01	Sample No. S4-2-02	Sample No. S8L-3-01	Sample No. S8L-3-02	Sample No. S8L-4-01	Sample No. S9L-4-01	Sample No. S8L-4-02
2,2-Dichloropropane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1-Dichloropropene	6U	6U	6U	6U	6U	6U	6U	6U	6U
cis-1,3-Dichloropropene	6U	6U	6U	6U	6U	6U	6U	6U	6U
trans-1,3-Dichloropropene	6U	6U	6U	6U	6U	6U	6U	6U	6U
cis-1,4-Dichloro-2-butene	6U	6U	6U	6U	6U	6U	6U	6U	6U
trans-1,4-Dichloro-2-butene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Ethylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Ethyl Methacrylate	6U	6U	6U	6U	6U	6U	6U	6U	6U
Hexachlorobutadiene	6U	6U	6U	6U	6U	6U	6U	6U	6U
2-Hexanone	12U	12U	12U	12U	12U	12U	12U	12U	13U
Iodomethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Isopropylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
P-Isopropyltoluene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Methacrylonitrile	6U	6U	6U	6U	6U	6U	6U	6U	6U
Methylene Chloride	12U	12U	12U	12U	12U	12U	12U	12U	13U
Methyl Methacrylate	6U	6U	6U	6U	6U	6U	6U	6U	6U
4-Methyl-2-pentanone	12U	12U	12U	12U	12U	12U	12U	12U	13U
Methyl-tert-butyl ether	6U	6U	6U	6U	6U	6U	6U	6U	6U
Naphthalene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Pentachloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
N-Propylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Styrene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1,1,2-Tetrachloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1,2,2-Tetrachloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Tetrachloroethene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Toluene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2,3-Trichlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2,4-Trichlorobenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1,1-Trichloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,1,2-Trichloroethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
Trichloroethene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Trichlorofluoromethane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2,3-Trichloropropane	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,2,4-Trimethylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
1,3,5-Trimethylbenzene	6U	6U	6U	6U	6U	6U	6U	6U	6U
Vinyl Acetate	12U	12U	12U	12U	12U	12U	12U	12U	13U
Vinyl Chloride	12U	12U	12U	12U	12U	12U	12U	12U	13U
Xylene (Total)	6U	6U	6U	6U	6U	6U	6U	6U	6U

Appendix C
Table 2

HAZ-MAT RFI
SOIL SAMPLES - VOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S8P-5-01	Sample No. S8P-5-02	Sample No. S8P-6-01	Sample No. S8P-6-02
Acetone	62U	64U	60U	62U
Acrylonitrile	6U	6U	6U	6U
Allyl Chloride	6U	6U	6U	6U
Benzene	6U	6U	6U	6U
Bromobenzene	6U	6U	6U	6U
Bromochloromethane	6U	6U	6U	6U
Bromodichloromethane	6U	6U	6U	6U
Bromoform	6U	6U	6U	6U
Bromomethane	12U	13U	12U	12U
2-Butanone	12U	13U	12U	12U
N-Butylbenzene	6U	6U	6U	6U
Sec-Butylbenzene	6U	6U	6U	6U
Tert-Butylbenzene	6U	6U	6U	6U
Carbon Disulfide	6U	6U	6U	6U
Carbon Tetrachloride	6U	6U	6U	6U
Chlorobenzene	6U	6U	6U	6U
Chlorodibromomethane	6U	6U	6U	6U
Chloroethane	12U	13U	12U	12U
2-Chloroethyl Vinyl Ether	12U	13U	12U	12U
Chloroform	6U	6U	6U	6U
Chloromethane	12U	13U	12U	12U
2-Chlorotoluene	6U	6U	6U	6U
4-Chlorotoluene	6U	6U	6U	6U
1,2-Dibromo-3-chloropropane	6U	6U	6U	6U
1,2-Dibromoethane	6U	6U	6U	6U
Dibromomethane	6U	6U	6U	6U
1,2-Dichlorobenzene	6U	6U	6U	6U
1,3-Dichlorobenzene	6U	6U	6U	6U
1,4-Dichlorobenzene	6U	6U	6U	6U
Dichlorodifluoromethane	12U	13U	12U	12U
1,1-Dichloroethane	6U	6U	6U	6U
1,2-Dichlorethane	6U	6U	6U	6U
1,1-Dichloroethene	6U	6U	6U	6U
cis-1,2-Dichloroethene	6U	6U	6U	6U
trans-1,2-Dichloroethene	6U	6U	6U	6U
1,2-Dichloropropane	6U	6U	6U	6U
1,3-Dichloropropane	6U	6U	6U	6U

Table 2 (continued)

HAZ-MAT RFI

SOIL SAMPLES - VOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S8P-5-01	Sample No. S8P-5-02	Sample No. S8P-6-01	Sample No. S8P-6-02
2,2-Dichloropropane	6U	6U	6U	6U
1,1-Dichloropropene	6U	6U	6U	6U
cis-1,3-Dichloropropene	6U	6U	6U	6U
trans-1,3-Dichloropropene	6U	6U	6U	6U
cis-1,4-Dichloro-2-butene	6U	6U	6U	6U
trans-1,4-Dichloro-2-butene	6U	6U	6U	6U
Ethylbenzene	6U	6U	6U	6U
Ethyl Methacrylate	6U	6U	6U	6U
Hexachlorobutadiene	6U	6U	6U	6U
2-Hexanone	12U	13U	12U	12U
Iodomethane	6U	6U	6U	6U
Isopropylbenzene	6U	6U	6U	6U
P-Isopropyltoluene	6U	6U	6U	6U
Methacrylonitrile	6U	6U	6U	6U
Methylene Chloride	12U	13U	12U	12U
Methyl Methacrylate	6U	6U	6U	6U
4-Methyl-2-pentanone	12U	13U	12U	12U
Methyl-tert-butyl ether	6U	6U	6U	6U
Naphthalene	6U	6U	6U	6U
Pentachloroethane	6U	6U	6U	6U
N-Propylbenzene	6U	6U	6U	6U
Styrene	6U	6U	6U	6U
1,1,1,2-Tetrachloroethane	6U	6U	6U	6U
1,1,2,2-Tetrachloroethane	6U	6U	6U	6U
Tetrachloroethene	6U	6U	6U	6U
Toluene	6U	6U	6U	6U
1,2,3-Trichlorobenzene	6U	6U	6U	6U
1,2,4-Trichlorobenzene	6U	6U	6U	6U
1,1,1-Trichloroethane	6U	6U	6U	6U
1,1,2-Trichloroethane	6U	6U	6U	6U
Trichloroethene	6U	6U	6U	6U
Trichlorofluoromethane	6U	6U	6U	6U
1,2,3-Trichloropropane	6U	6U	6U	6U
1,2,4-Trimethylbenzene	6U	6U	6U	6U
1,3,5-Trimethylbenzene	6U	6U	6U	6U
Vinyl Acetate	12U	13U	12U	12U
Vinyl Chloride	12U	13U	12U	12U
Xylene (Total)	6U	6U	6U	6U

APPENDIX D

SVOC Data

Appendix D

Table 1

HAZ-MAT RFI

SOIL SAMPLES - SEMIVOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S4-1-01	Sample No. S4-1-02	Sample No. S4-2-01	Sample No. S4-2-02	Sample No. S8L-3-01	Sample No. S8L-3-02	Sample No. S8L-4-01	Sample No. S8L-4-02	Sample No. S9L-4-01
Phenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
Bis(2-Chloroethyl)ether	410U	420U	400U	410U	410U	410U	410U	430U	410U
2-Chlorophenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
1,3-Dichlorobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
1,4-Dichlorobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
1,2-Dichlorobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
2-Methylphenol (o-Cresol)	410U	420U	400U	410U	410U	410U	410U	430U	410U
Bis(2-Chloroisopropyl)ether	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Methylphenol (p-Cresol)	410U	420U	400U	410U	410U	410U	410U	430U	410U
N-Nitroso-Di-N-propylamine	410U	420U	400U	410U	410U	410U	410U	430U	410U
Hexachloroethane	410U	420U	400U	410U	410U	410U	410U	430U	410U
Nitrobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Isophorone	410U	420U	400U	410U	410U	410U	410U	430U	410U
2-Nitrophenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4-Dimethylphenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
Bis(2-chloroethoxy)methane	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4-Dichlorophenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
1,2,4-Trichlorobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Naphthalene	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Chloroaniline	810U	840U	800U	820U	820U	810U	810U	870U	810U
Hexachlorobutadiene	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Chloro-3-Methylphenol	810U	840U	800U	820U	820U	810U	810U	870U	810U
2-Methylnaphthalene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Hexachorocyclopentadiene	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4,6-Trichlorophenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4,5-Trichlorophenol	410U	420U	400U	410U	410U	410U	410U	430U	410U
2-Chloronaphthalene	410U	420U	400U	410U	410U	410U	410U	430U	410U
2-Nitroaniline	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
Dimethyl Phthalate	410U	420U	400U	410U	410U	410U	410U	430U	410U
Acenaphthylene	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,6-Dinitrotoluene	410U	420U	400U	410U	410U	410U	410U	430U	410U
3-Nitroaniline	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U

Table 1 (continued)

HAZ-MAT RFI

SOIL SAMPLES - SEMIVOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S4-1-01	Sample No. S4-1-02	Sample No. S4-2-01	Sample No. S4-2-02	Sample No. S8L-3-01	Sample No. S8L-3-02	Sample No. S8L-4-01	Sample No. S8L-4-02	Sample No. S9L-4-01
Acenaphthene	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4-Dinitrophenol	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
4-Nitrophenol	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
Dibenzofuran	410U	420U	400U	410U	410U	410U	410U	430U	410U
2,4-Dinitrotoluene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Diethylphthalate	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Chlorophenyl-Phenylether	410U	420U	400U	410U	410U	410U	410U	430U	410U
Fluorene	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Nitroaniline	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
4,6-Dinitro-2-Methylphenol	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
N-Nitrosodiphenylamine	410U	420U	400U	410U	410U	410U	410U	430U	410U
4-Bromophenyl-Phenylether	410U	420U	400U	410U	410U	410U	410U	430U	410U
Hexachlorobenzene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Pentachlorophenol	2000U	2000U	2000U	2000U	2000U	2000U	2000U	2100U	2000U
Phenanthrene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Anthracene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Di-n-butyl phthalate	410U	420U	400U	410U	410U	410U	410U	430U	410U
Fluoranthene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Pyrene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Butyl benzyl phthalate	410U	420U	400U	410U	410U	410U	410U	430U	410U
3, 3'-Dichlorobenzibine	810U	840U	800U	820U	820U	810U	810U	870U	810U
Benzo(a)Anthracene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Chrysene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Bis(2-Ethylhexyl)phthalate	410U	420U	400U	410U	410U	**490**	410U	430U	410U
Di-N-Octyl phthalate	410U	420U	400U	410U	410U	410U	410U	430U	410U
Benzo(b)Fluoranthene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Benzo(k)Fluoranthene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Benzo(a)Pyrene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Indeno(1,2,3-cd)pyrene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Dibenz(a,h)Anthracene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Benzo(g,h,i)Perylene	410U	420U	400U	410U	410U	410U	410U	430U	410U
Carbazole	410U	420U	400U	410U	410U	410U	410U	430U	410U

Appendix D

Table 2

HAZ-MAT RFI

SOIL SAMPLES - SEMIVOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S8P-5-01	Sample No. S8P-5-02	Sample No. S8P-6-01	Sample No. S8P-6-02
Phenol	410U	420U	400U	410U
Bis(2-Chloroethyl)ether	410U	420U	400U	410U
2-Chlorophenol	410U	420U	400U	410U
1,3-Dichlorobenzene	410U	420U	400U	410U
1,4-Dichlorobenzene	410U	420U	400U	410U
1,2-Dichlorobenzene	410U	420U	400U	410U
2-Methylphenol (o-Cresol)	410U	420U	400U	410U
Bis(2-Chloroisopropyl)ether	410U	420U	400U	410U
4-Methylphenol (p-Cresol)	410U	420U	400U	410U
N-Nitroso-Di-N-propylamine	410U	420U	400U	410U
Hexachloroethane	410U	420U	400U	410U
Nitrobenzene	410U	420U	400U	410U
Isophorone	410U	420U	400U	410U
2-Nitrophenol	410U	420U	400U	410U
2,4-Dimethylphenol	410U	420U	400U	410U
Bis(2-chloroethoxy)methane	410U	420U	400U	410U
2,4-Dichlorophenol	410U	420U	400U	410U
1,2,4-Trichlorobenzene	410U	420U	400U	410U
Naphthalene	410U	420U	400U	410U
4-Chloroaniline	810U	840U	800U	820U
Hexachlorobutadiene	410U	420U	400U	410U
4-Chloro-3-Methylphenol	810U	840U	800U	820U
2-Methylnaphthalene	410U	420U	400U	410U
Hexachorocyclopentadiene	410U	420U	400U	410U
2,4,6-Trichlorophenol	410U	420U	400U	410U
2,4,5-Trichlorophenol	410U	420U	400U	410U
2-Chloronaphthalene	410U	420U	400U	410U
2-Nitroaniline	2000U	2000U	1900U	2000U
Dimethyl Phthalate	410U	420U	400U	410U
Acenaphthylene	410U	420U	400U	410U
2,6-Dinitrotoluene	410U	420U	400U	410U
3-Nitroaniline	2000U	2000U	1900U	2000U
Acenaphthene	410U	420U	400U	410U
2,4-Dinitrophenol	2000U	2000U	1900U	2000U
4-Nitrophenol	2000U	2000U	1900U	2000U
Dibenzofuran	410U	420U	400U	410U
2,4-Dinitrotoluene	410U	420U	400U	410U
Diethylphthalate	410U	420U	400U	410U

Table 2b (continued)

HAZ-MAT RFI

SOIL SAMPLES - SEMIVOLATILE ORGANICS ANALYTICAL RESULTS

Analyte	Sample No. S8P-5-01	Sample No. S8P-5-02	Sample No. S8P-6-01	Sample No. S8P-6-02
4-Chlorophenyl-Phenylether	410U	420U	400U	410U
Fluorene	410U	420U	400U	410U
4-Nitroaniline	2000U	2000U	1900U	2000U
4,6-Dinitro-2-Methylphenol	2000U	2000U	1900U	2000U
N-Nitrosodiphenylamine	410U	420U	400U	410U
4-Bromophenyl-Phenylether	410U	420U	400U	410U
Hexachlorobenzene	410U	420U	400U	410U
Pentachlorophenol	2000U	2000U	1900U	2000U
Phenanthrene	410U	420U	400U	410U
Anthracene	410U	420U	400U	410U
Di-n-butyl phthalate	410U	420U	400U	410U
Fluoranthene	410U	420U	400U	410U
Pyrene	410U	420U	400U	410U
Butyl benzyl phthalate	410U	420U	400U	410U
3, 3'-Dichlorobenzibine	810U	840U	800U	820U
Benzo(a)Anthracene	410U	420U	400U	410U
Chrysene	410U	420U	400U	410U
Bis(2-Ethylhexyl)phthalate	410U	420U	400U	410U
Di-N-Octyl phthalate	410U	420U	400U	410U
Benzo(b)Fluoranthene	410U	420U	400U	410U
Benzo(k)Fluoranthene	410U	420U	400U	410U
Benzo(a)Pyrene	410U	420U	400U	410U
Indeno(1,2,3-cd)pyrene	410U	420U	400U	410U
Dibenz(a,h)Anthracene	410U	420U	400U	410U
Benzo(g,h,i)Perylene	410U	420U	400U	410U
Carbazole	410U	420U	400U	410U

APPENDIX E
Metals Data

Appendix E

Table 1

HAZ-MAT RFI

mg/kg

SOIL SAMPLES - METALS ANALYTICAL RESULTS

Analyte	Sample No. S4-1-01	Sample No. S4-1-02	Sample No. S4-2-01	Sample No. S4-2-02	Sample No. S8L-3-01	Sample No. S8L-3-02	Sample No. S8L-4-01	Sample No. S8L-4-02	Sample No. S9L-4-01
Arsenic 15	4.2	5.7	5.1	6.6	16.8	6.3	5.7	5.6	4.6
Barium 295	255	227	203	295	195	176	195	157	172
Cadmium u	0.11B	0.10U	0.09U	0.10U	0.07U	0.09U	0.10U	0.40B	0.10U
Chromium 24	16.7	21.3	13.5	20.1	15.0	14.8	11.9	24.0	13.1
Lead 27.9	19.1	12.3	**26.0**	10.9	**27.9**	19.3	9.9	12.6	7.7
Mercury u	0.04U	0.04U	0.04U	0.04U	0.05	0.04U	0.04U	0.04U	0.03U
Selenium 0.99	**0.98**	**0.41B**	**0.99**	0.19U	1.0	**0.55**	**0.80**	**0.88**	**0.55**
Silver u	0.08U	0.10U	0.09U	0.10U	0.07U	0.09U	0.10U	0.11U	0.10U

Appendix E
Table 2

HAZ-MAT RFI

SOIL SAMPLES - METALS ANALYTICAL RESULTS

Analyte	Sample No. S8P-5-01	Sample No. S8P-5-02	Sample No. S8P-6-01	Sample No. S8P-6-02
Arsenic	5.9	**19.8**	5.6	7.1
Barium	181	261	159	252
Cadmium	0.19B	0.12B	0.71	0.11U
Chromium	12.1	16.6	13.6	17.4
Lead	**27.6**	20.6	**42.4**	10.6
Mercury	0.04U	0.04U	0.05	0.04U
Selenium	**0.39B**	0.22U	**0.44B**	**0.48B**
Silver	0.09U	0.09U	0.08U	0.11U

APPENDIX F
Soil Physical/Chemical Analyses Results

REPORT OF CHEMICAL AND PHYSICAL ANALYSIS

DATE ISSUED December 4, 1997 **GSI REPORT #**A-2321

SAMPLE OF Soil **GSI JOB #**2512292

MARKED Sample Received at GSI 10/20/97

CLIENT HAZ-MAT Response Disposal, Inc.

CHEMICAL ANALYSIS:

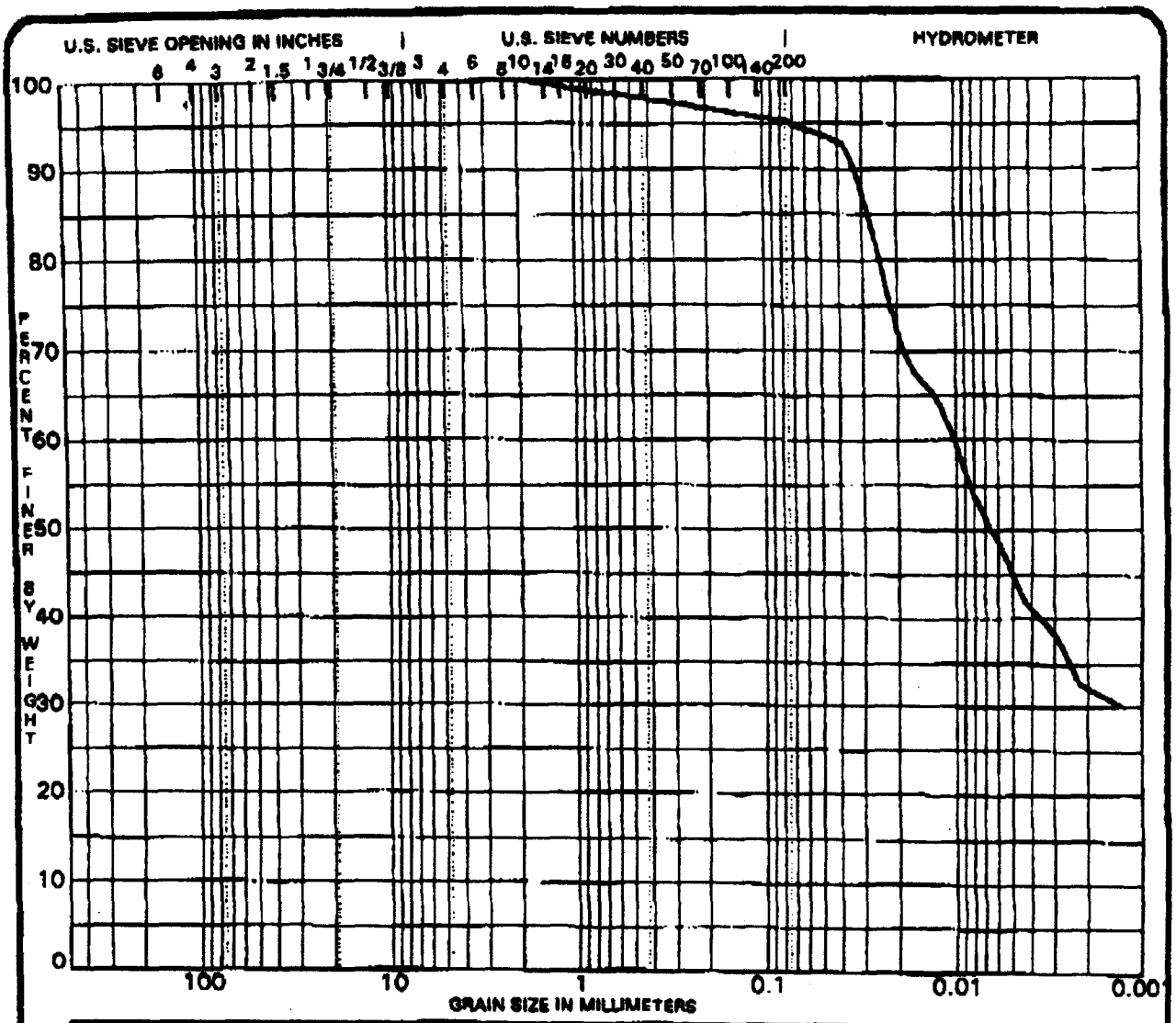
Total Organic Carbon, EPA 9060	32000 mg/kg
Cation Exchange Capacity, EPA 9081	21.6 mequiv/100
pH, ASTM G51	7.17

PHYSICAL ANALYSIS

Atterberg Limits:	
LL	52
PL	20
PI	32
Moisture Content	23.3
Soil Classification	CH
Grain Size Analysis, Astm D422	See Attached

GEOTECHNICAL SERVICES INC.

By



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	MC%	LL	PL	PI	Cc	Cu
●	A-2321	0.0	FAT CLAY CH	23.3	52	20	32		

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	A-2321	0.0	2.00	0.01			0.0	4.8	50.3	44.9

PROJECT HAZ-MAT Response Disposal, Inc. - JOB NO. 2512282
DATE 12/04/97

GRADATION CURVES
GEOTECHNICAL SERVICES, INC.
KANSAS CITY, MISSOURI